

3D Printer User Guide

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*** NOTE: THERE IS A VIDEO SERIES AVAILABLE ONLINE FOR VISUAL REFERENCE FOR ASSEMBLY**

The following safety precautions identifications are used in this manual



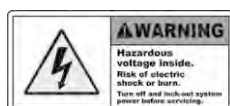
CAUTION: Potentially hazardous situation to be avoided.
Failure to avoid may result in minor or moderate injury.



WARNING: Potentially hazardous situation to be avoided.
Failure to avoid may result in serious injury.



Beware of Hot Surface: Some devices may radiate high temperature.
Be cautious and use safety gloves to avoid burns.



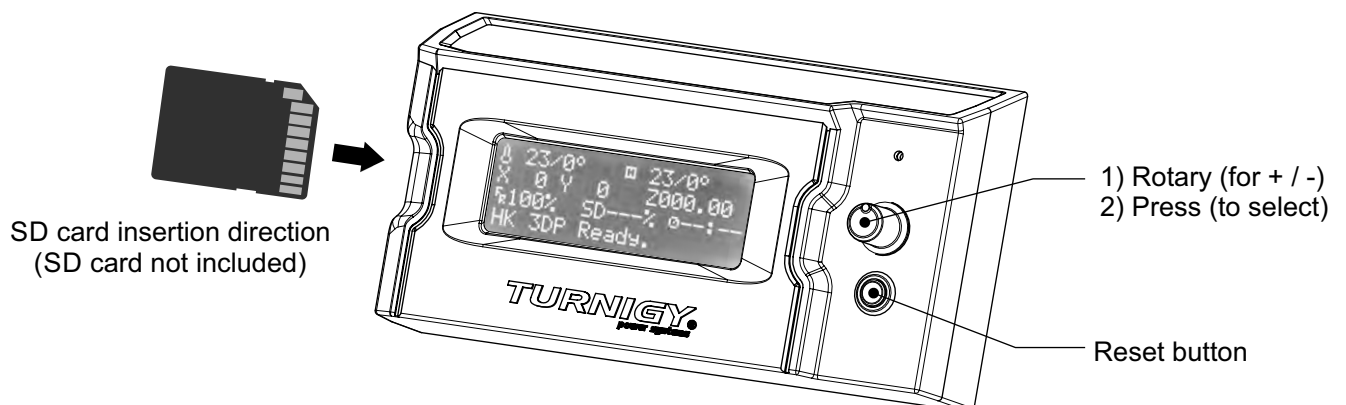
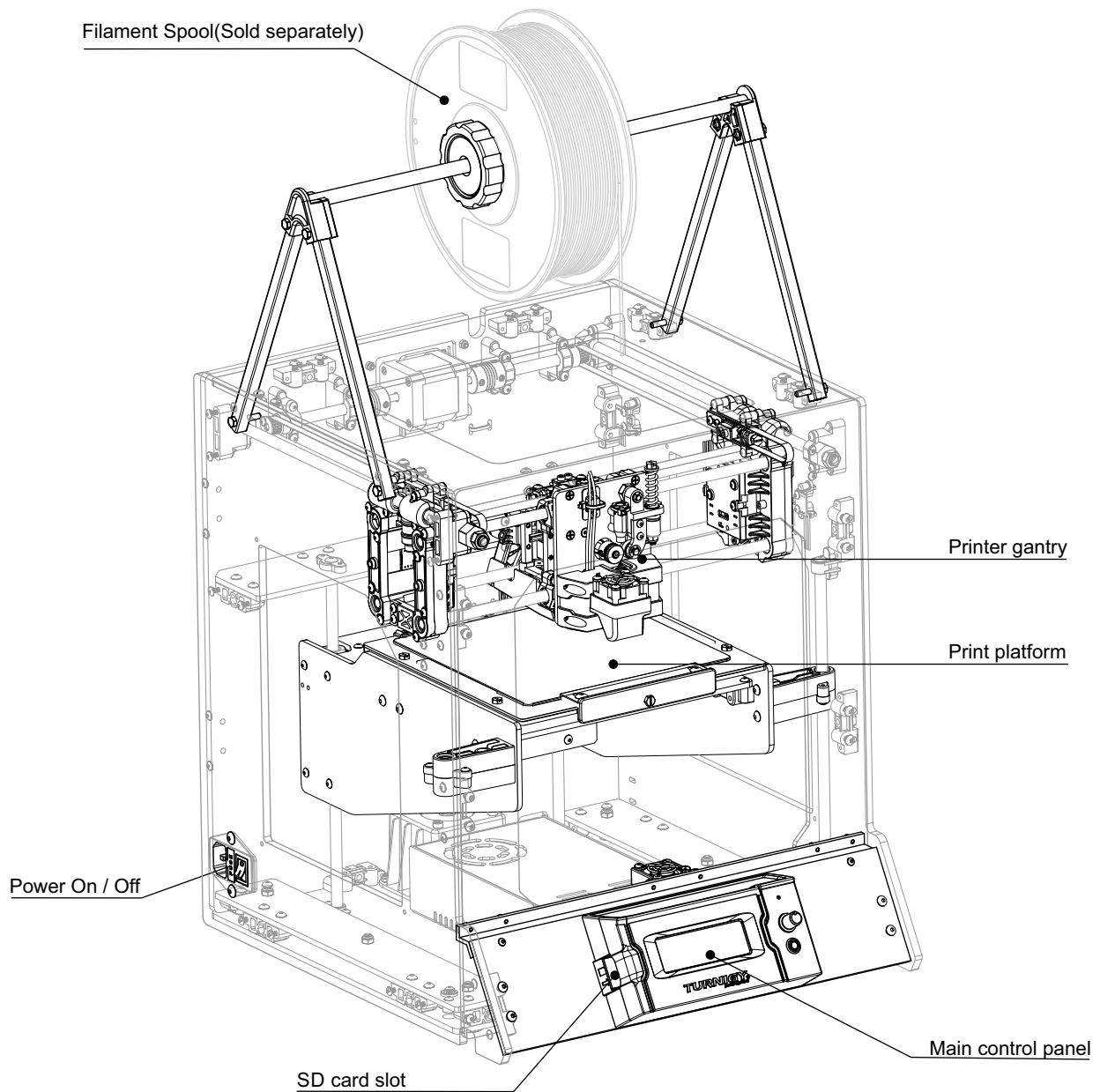
Turn off and lock-out system power before servicing.
Risk of electric shock or burn if failed to comply.



Wear safety glasses to avoid injury to your eyes.



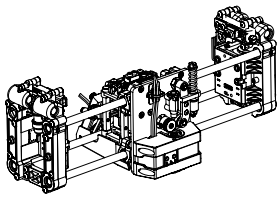
Use standard electrostatic discharge precautions



1.2

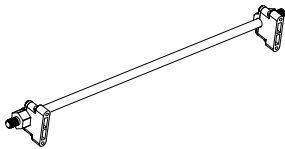
What's in the box

Box-A



Gantry
DSA3302-U14

x1



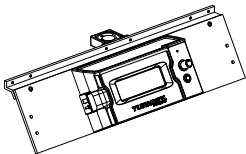
Gantry rail
DSA3302-U15

x2



Model cooling fan

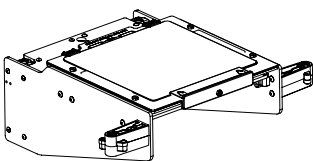
x1



Control Panel
DSA3302-U08

x1

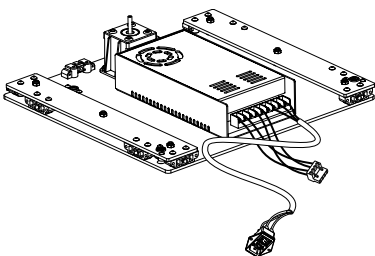
Box-B



Print Platform
DSA3302-U07

x1

Box-C



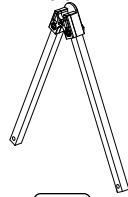
Bottom Panel & A/C Receptacle
DSA3302-U01

x1

Box-D

Filament spool holder Set (DSA3302-U17)

Filament spool support



x2



MST0861
+
MST0862

x1



MST0863

x1

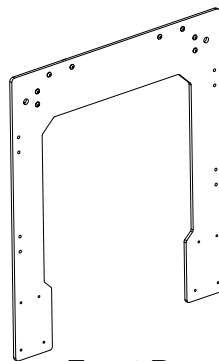
Screws
this box:



SCW0188
(HM4x22)

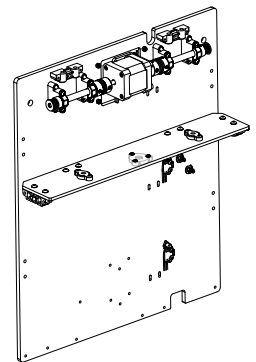
x5

Box-E



Front Panel
DSA3302-U04

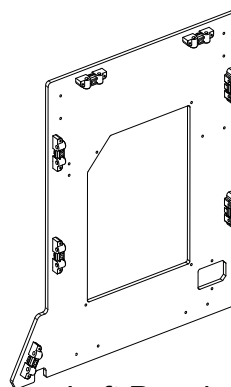
x1



Back Panel
DSA3302-U02

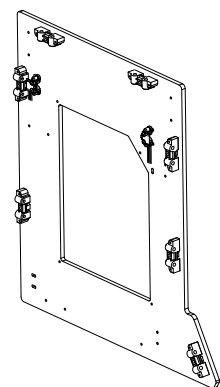
x1

Box-F



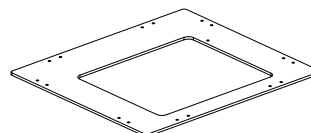
Left Panel
DSA3302-U06

x1



Right Panel
DSA3302-U05

x1



Top Panel
MST0658

x1

Box-G



Small nut (silver color)
MDT0139

x2



Nut (silver color)
MDT0140

x4



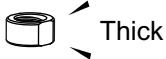
Torque coupling
MDT0142

x1



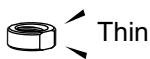
Z-axis lead screw
MST0625

x1



"Thick" Nut
(bronze color)
MST0865

x1



"Thin" Nut
(bronze color)
MST0866

x1



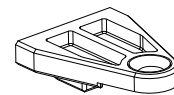
Spring
SPR0028

x1



Bearing
BER0038

x1



Lower bearing support
MST0651

x1



PM-3PT05-P7

x1



SCW0122
(TM3x12)

x4



SCW0039
(TM3x8)

x5



SCW0143
(TB4x14)

x40



SCW0153
(TB3x12)

x45



SCW0157
(TM4x12)

x10



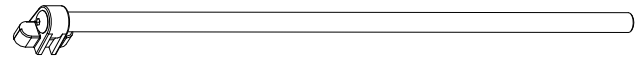
PM-3PT04-P01

x3



Rod
MST0600

x2



Pre-assembled Rod
(for Left and Right panels)

x2



Timing belt (Long)
ETP0110

x1



Timing belt (Short)
ETP0111

x2



USB cable (type A to type B)

x1



Power

x1



Spiral cut cable loom

x1



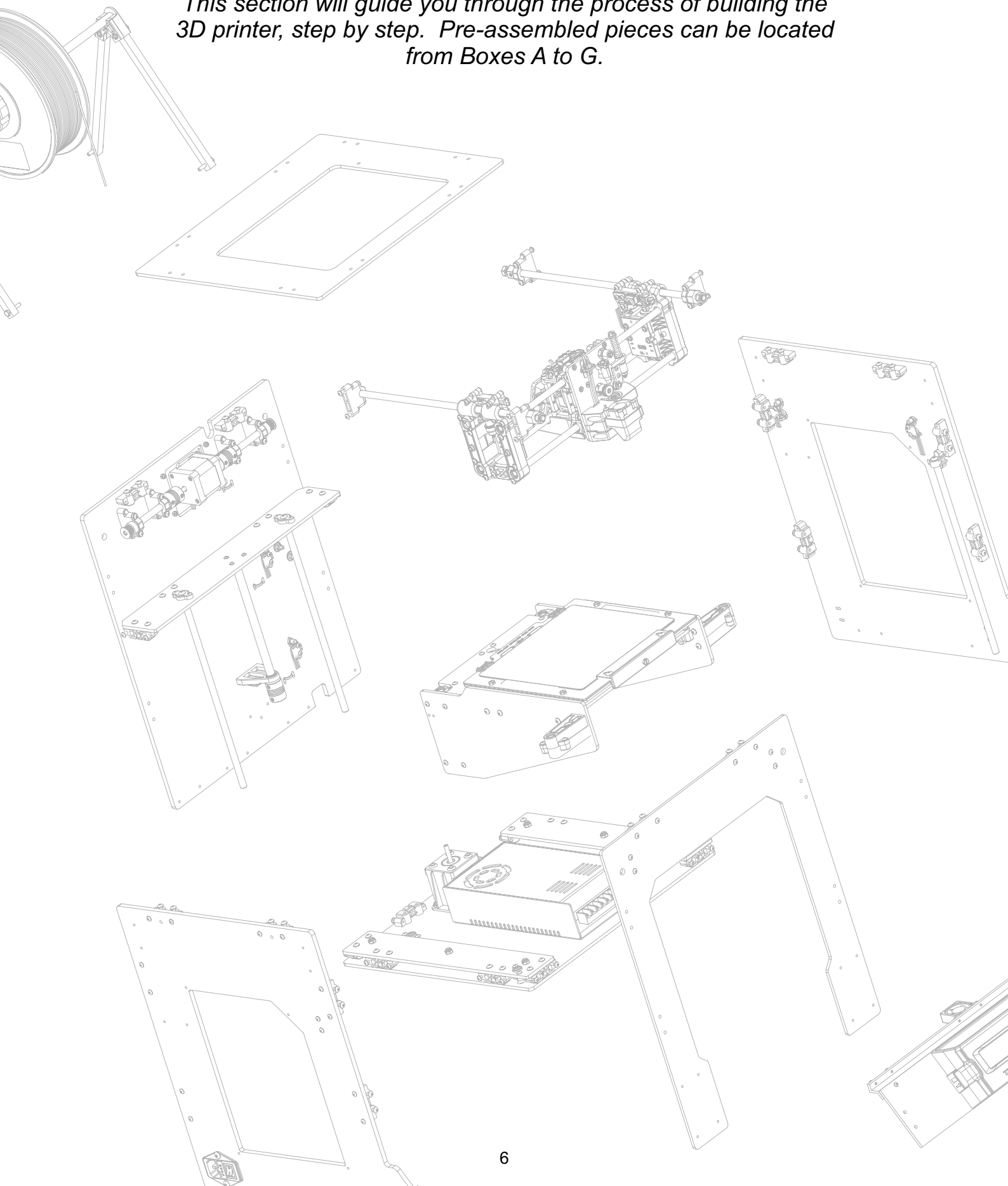
Zip tie

x10

2

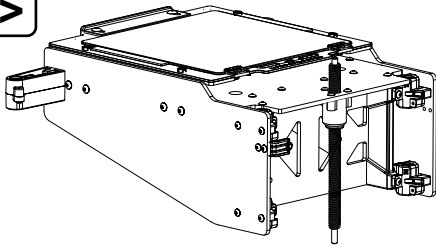
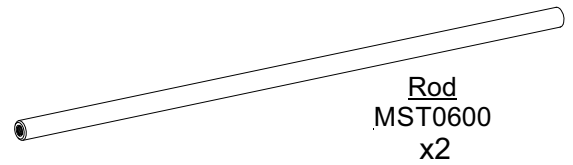
Assemble the 3D printer

This section will guide you through the process of building the 3D printer, step by step. Pre-assembled pieces can be located from Boxes A to G.



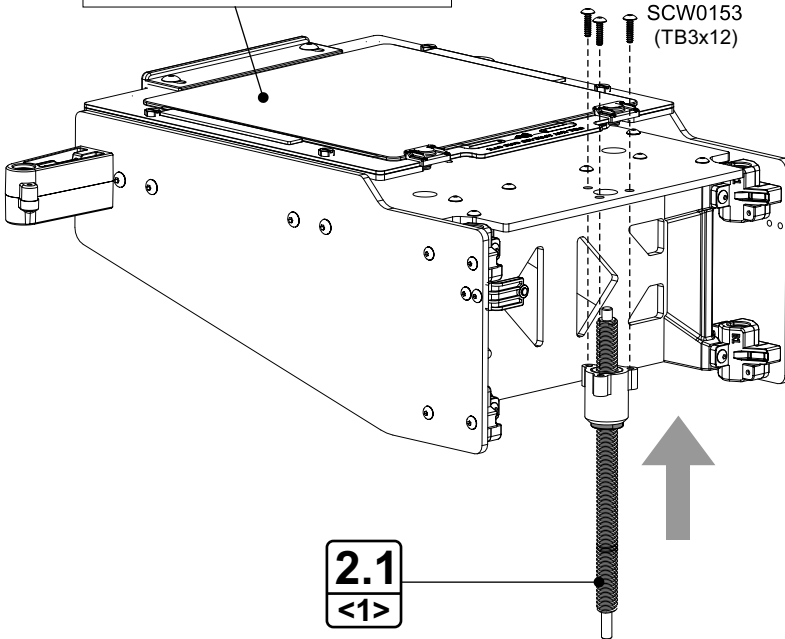
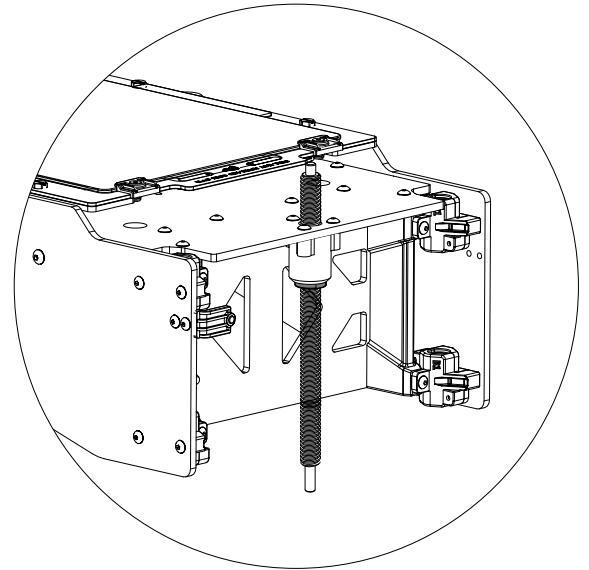
2.1**<2>**

Z-axis Lead Screw

Find the following accessories from: **Box G**SCW0153
(TB3x12)
x3SCW0157
(TM4x12)
x2Rod
MST0600
x22.0mm hex
driver

The Z lead screw can now be installed to the print platform by using a 2.0mm hex driver. The screws go in from the top

DSA3302-U07 Print platform
from **Box-B**

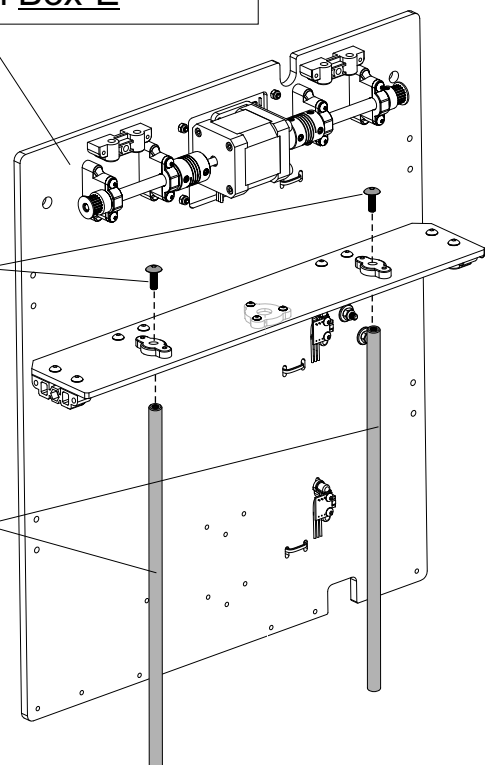
**2.1**
<1>**2.2****<1>**

Back Panel preparation

Start installing the 2 metal rods (MST0600) to the back panel as shown on the right

DSA3302-U02 Back panel
from **Box-E**

2.5mm hex
driver

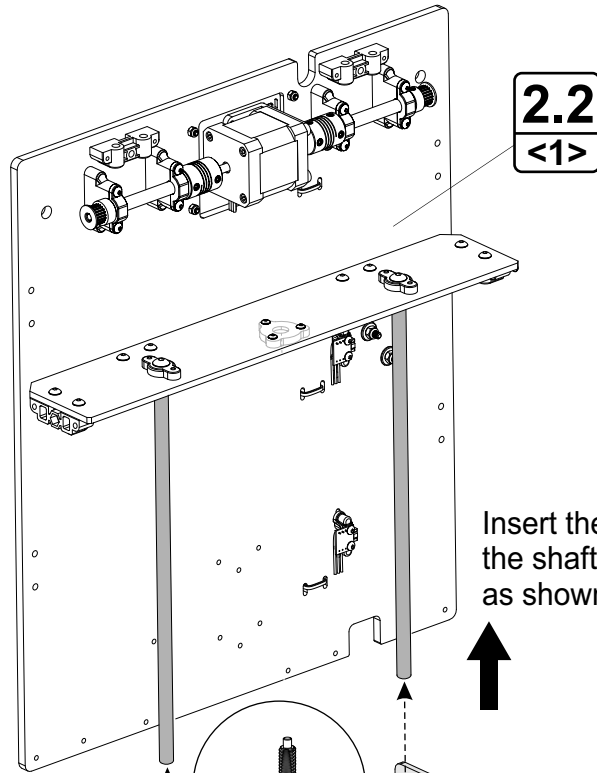
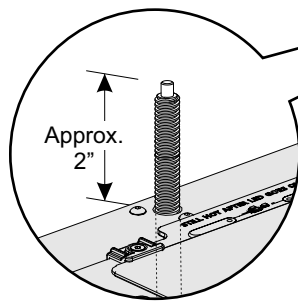
SCW0157
(TM4x12)Rod
MST0600

2.2

<2>

Assemble to Back and Base Panels

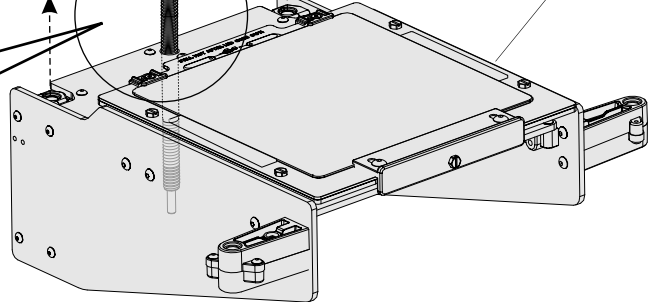
Turn the lead screw so that we have approximately 2 inches exposed from the top. This will help to align with the bearing.



Insert the print platform onto the shafts of the back panel as shown.

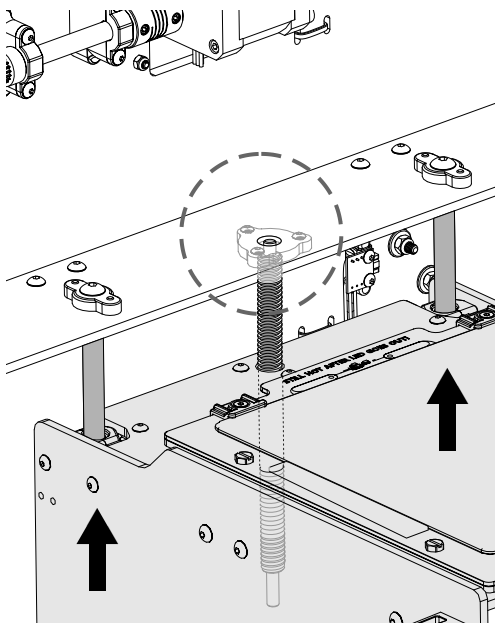
2.1

<2>



2.2

<3>



Slide the print platform upwards so that the Z-axis lead screw inserts into the bearing.

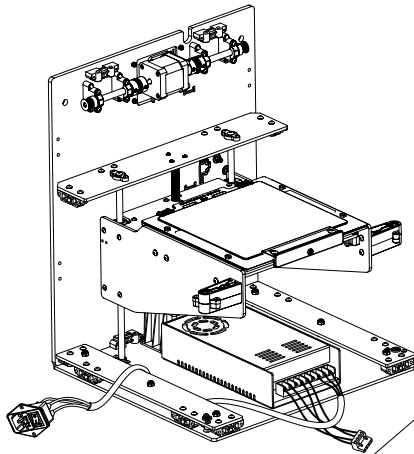


The movement of the bearings and rods will feel tight at this point, but we will tram (align) the system later.

2.2

<4>

Back and Bottom panels



Find the following accessories from: Box-G



SCW0122
(TM3x12)

x3



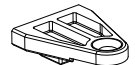
BER0038
Bearing

x1



MDT0142
Torque coupling

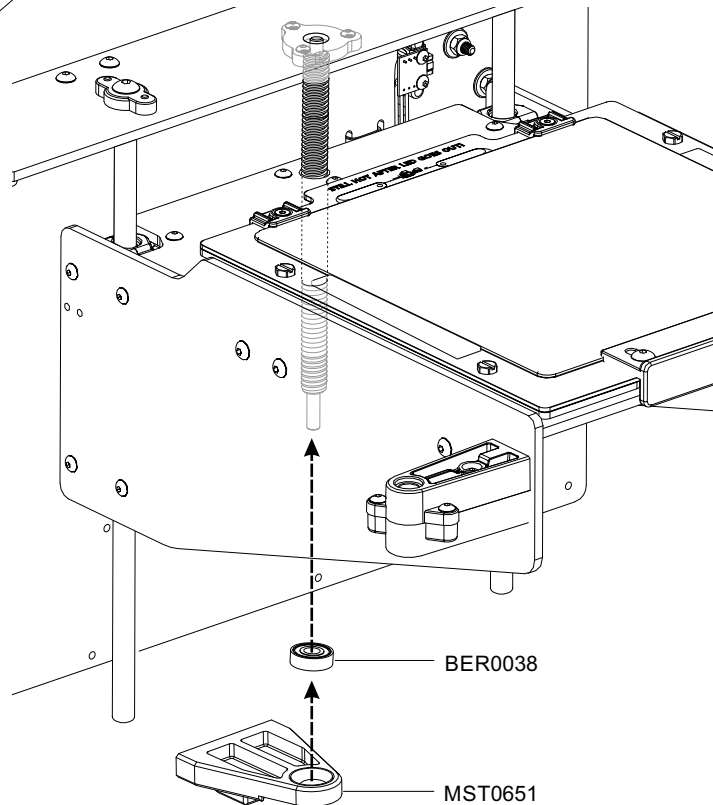
x1



MST0651
Lower bearing support

x1

Install the bearing in to the lower bearing support, and slide it onto the bottom of the Z-axis lead screw (bearing facing upward).



2.2

<5>

Install the 3 screws from the back side to secure the bearing support.

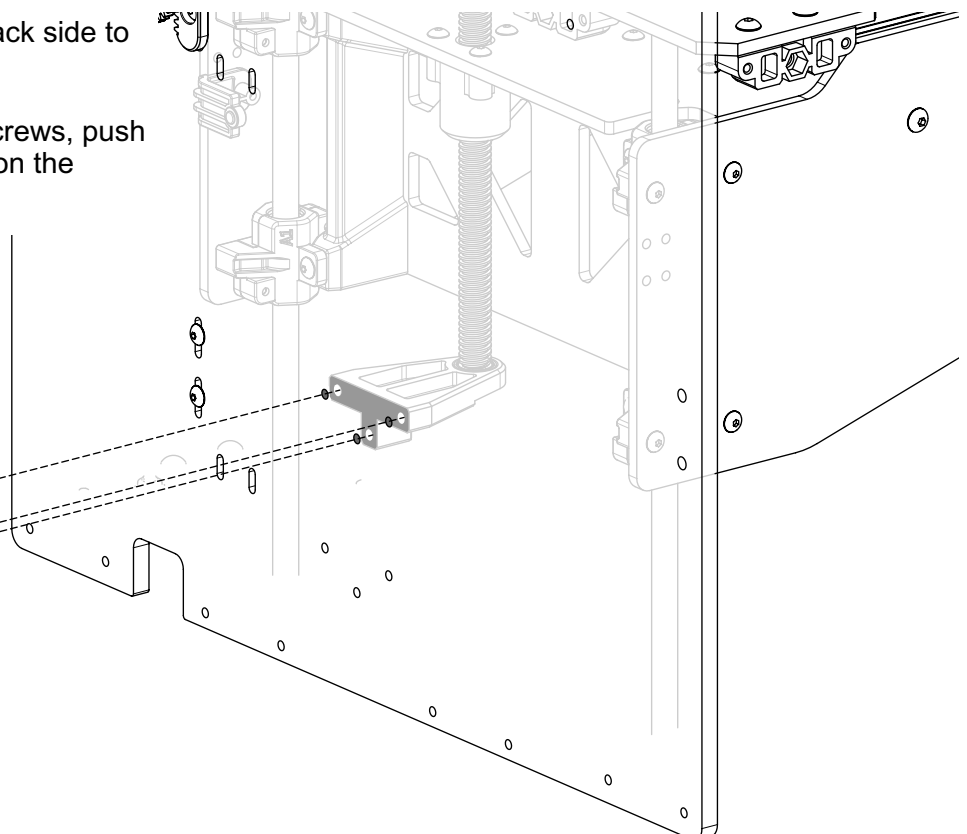
When tightening the support screws, push lightly up to put a little tension on the bearings.



2.0mm hex
driver

SCW0122
(TM3x12)

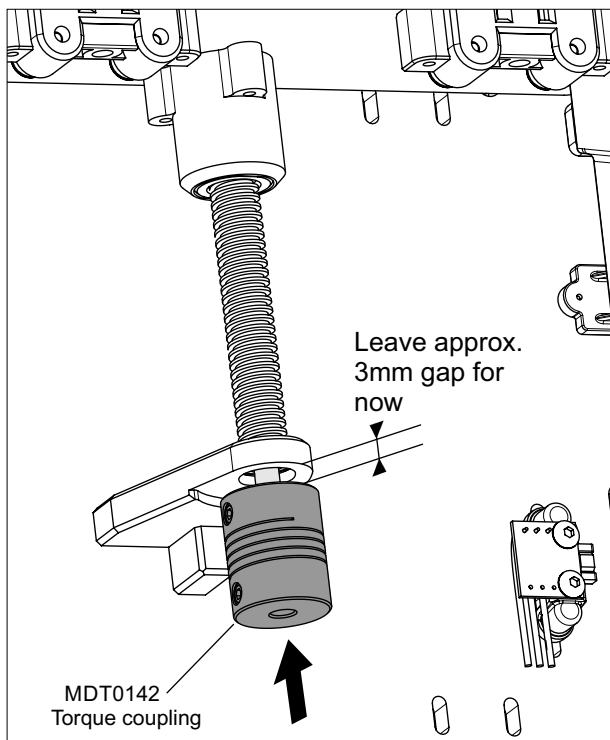
x3



2.2

<6>

Now install the torque coupling to the bottom of the lead screw.



Positioning of torque coupling is not critical. But at this moment, leave approx. 3mm distance (for tramping procedure later) between bearing support and the coupling.

Then tighten the coupling's UPPER screw only.

2.2

<7>

Next we are going to assemble the back panel to the bottom panel.

It is recommended to turn the back panel on its side and slide the bottom panel in place (making an "L" shape)

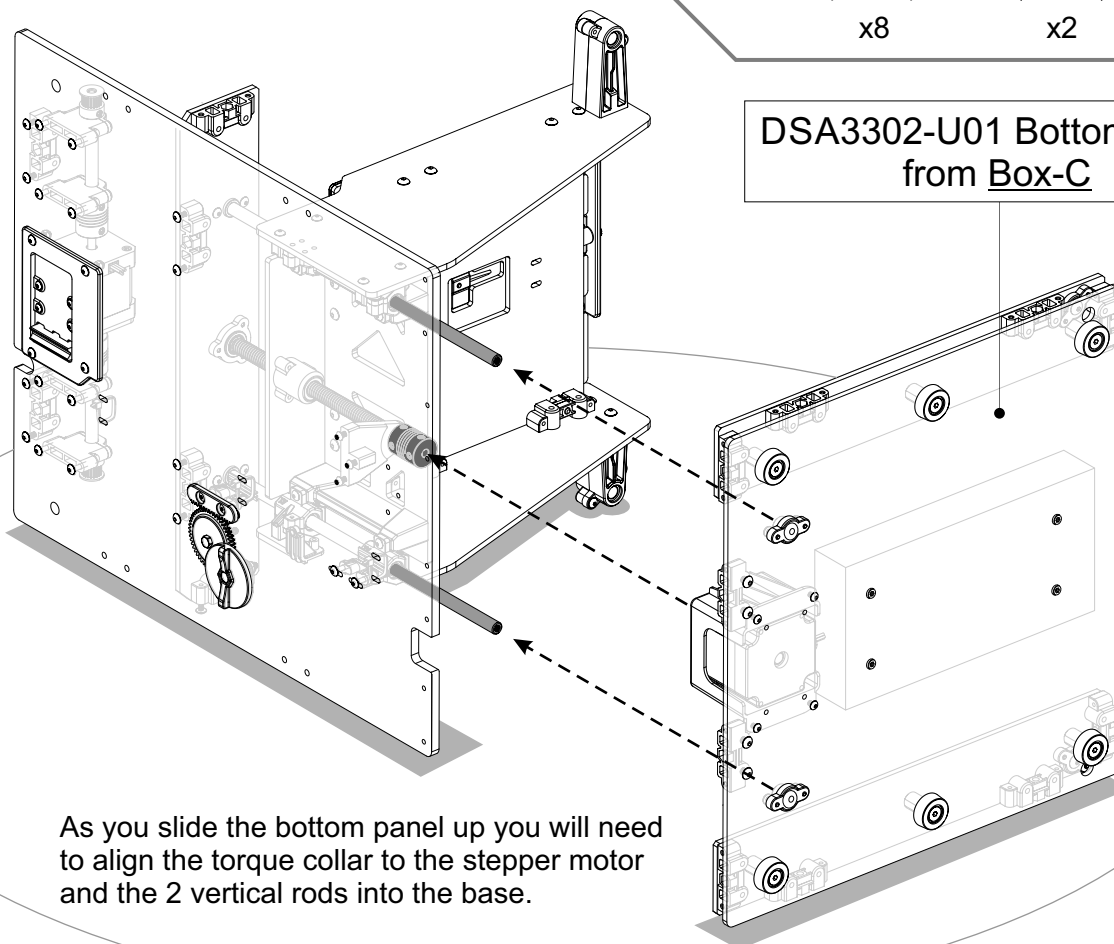
Find the following accessories from: Box-G

SCW0153
(TB3x12)
x8

SCW0157
(TM4x12)
x2

DSA3302-U01 Bottom panel
from Box-C

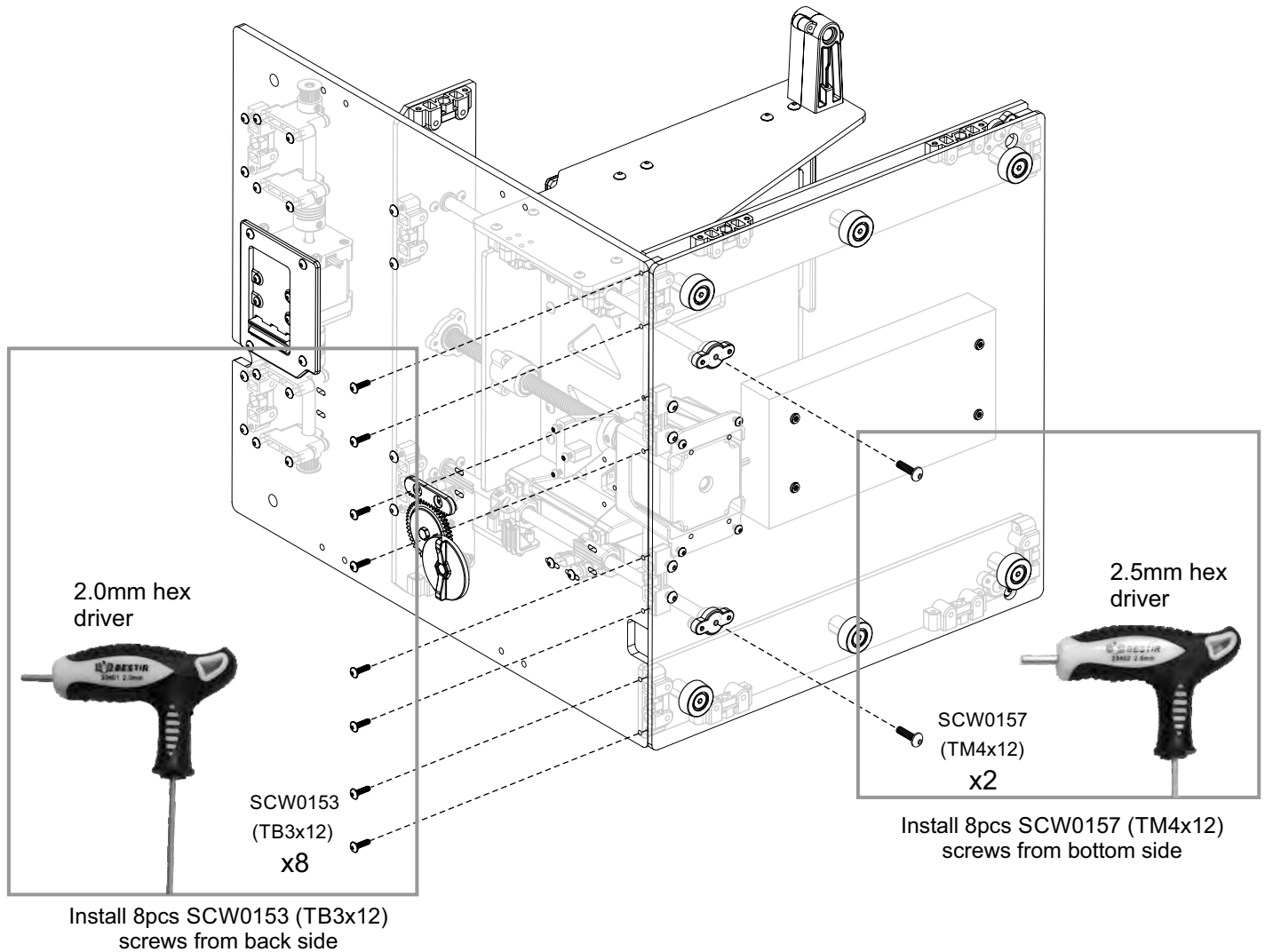
Any flat surface
(eg. table top)



2.2

<8>

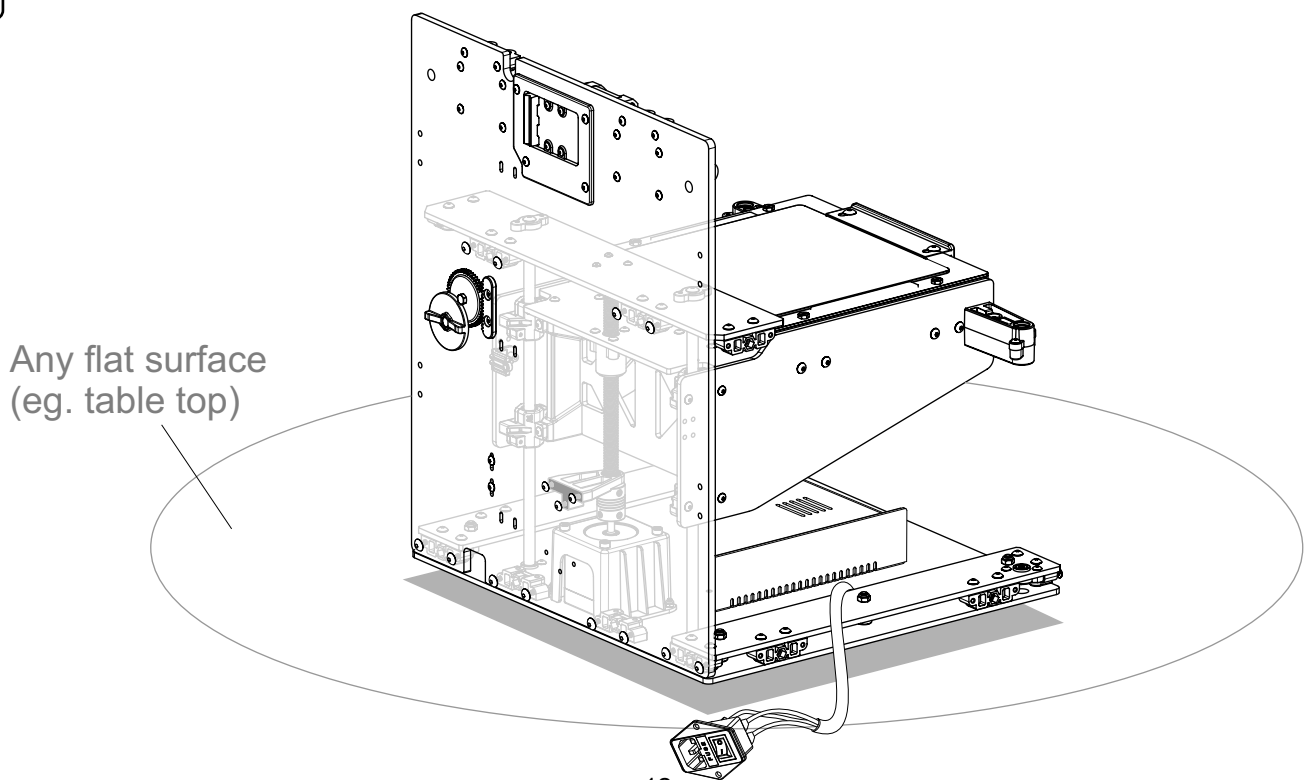
Once seated (shown below), install 8pcs SCW0153 screws from the backside and 2pcs SCW0157 screws from the bottom side into the rods



2.2

<9>

With the back panel and bottom panel attached reposition the frame vertical to the upright position. At this point we need to start to tram or square up the mechanics to ensure a smooth bind free motion

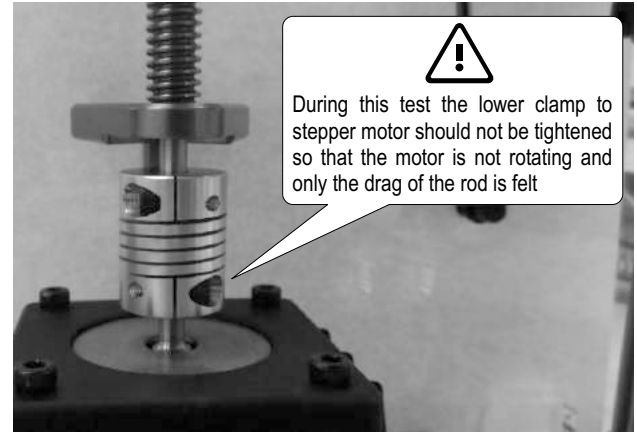


2.2

<10>

Tramming Back and Base Assembly

We need to check the start friction, turn the torque coupling (that is at the bottom of the lead screw) that we just installed left and right a few times, you will notice a heavy drag and possible binding on the print platform just make a mental note of how much strength it takes to rotate the rod.



2.2

<11>

Now to fix this problem, refer to diagrams 2.2a to 2.2c and loosen all the noted screws in order.

Loosen them just enough that there is no contact with the screw head and frame (Example on the right).

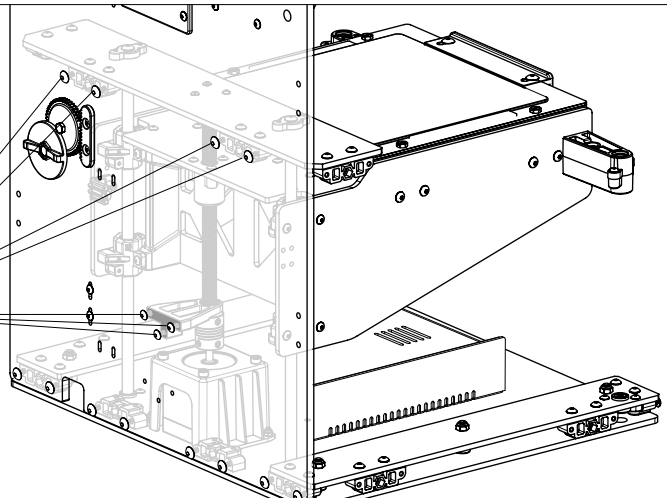


2.2a



2.0mm hex driver

First loosen these 7 screws at the back

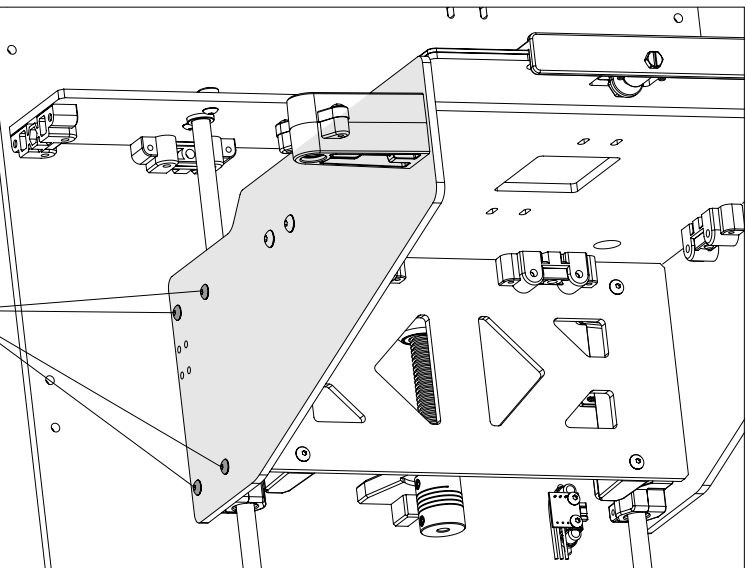


2.2b



2.0mm hex driver

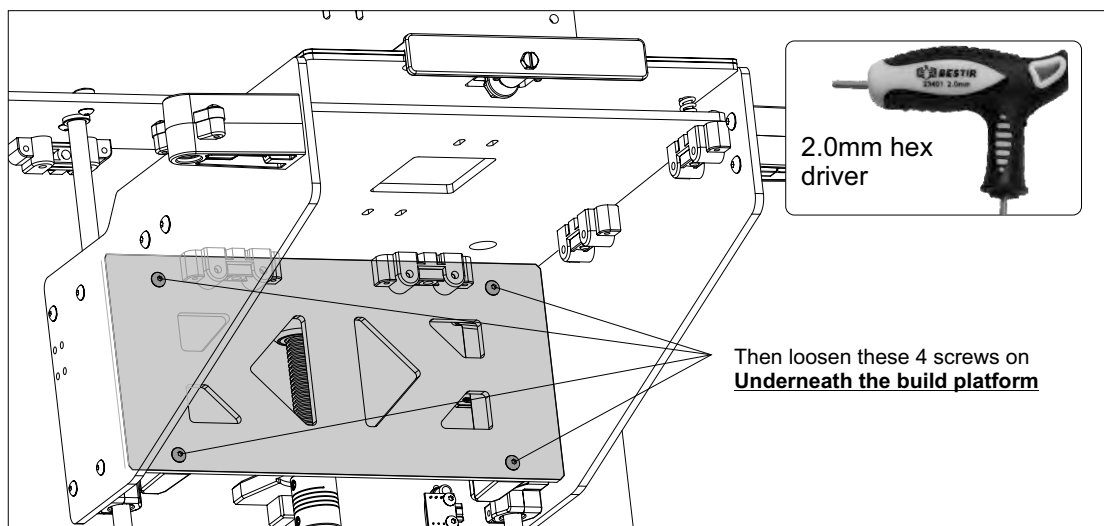
Then loosen these screws on **BOTH sides of print platform**



2.2

<11>

2.2c



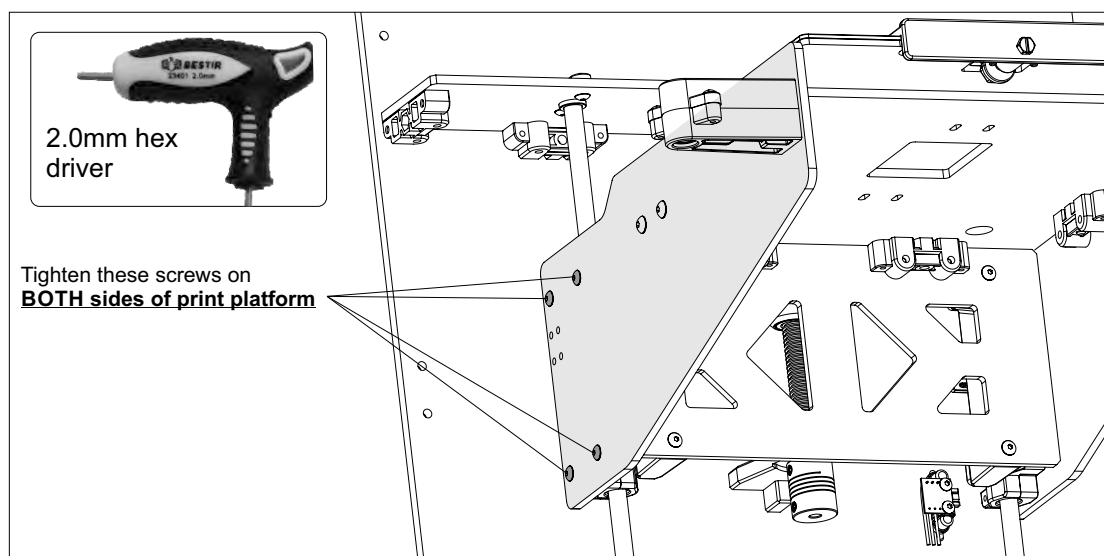
By loosening the hardware the mechanical parts can adjust to their natural tension-free positions alleviating binding.

2.2

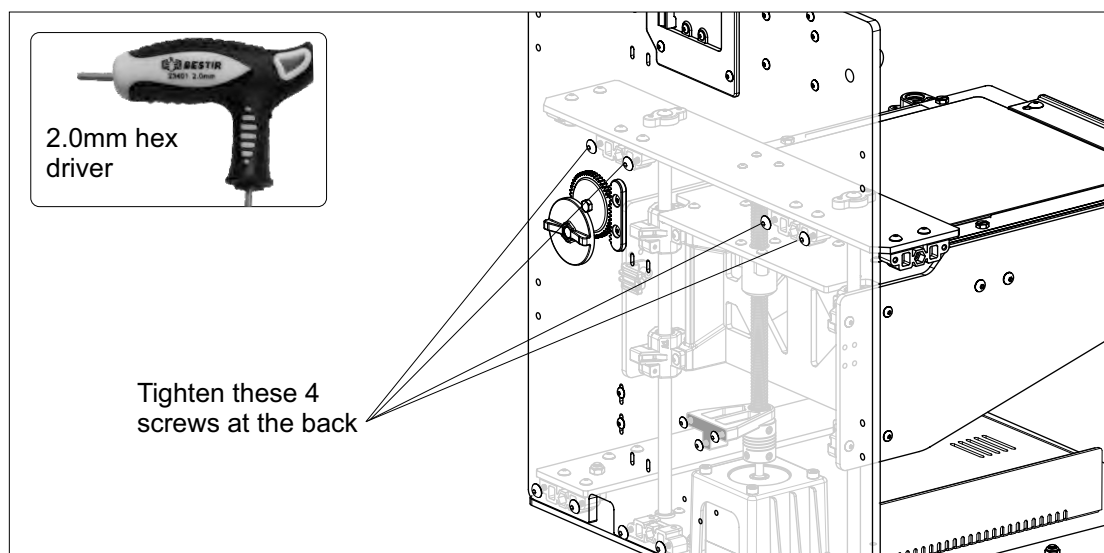
<12>

Now following diagrams 2.2d to 2.2g for tightening order (The sequence is critical), go through the hardware and re tighten the screws

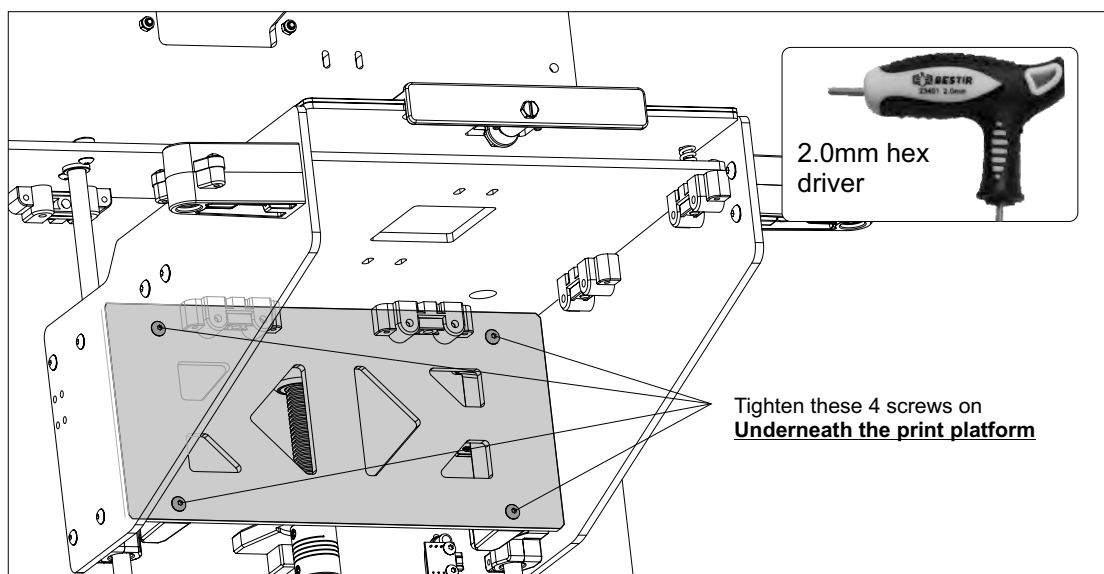
2.2d



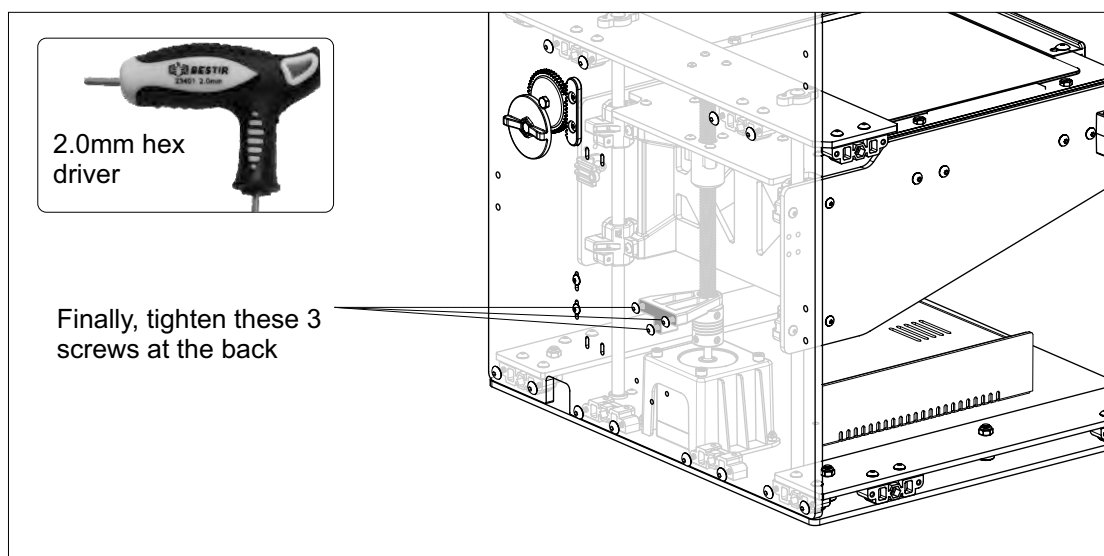
2.2e



2.2f



2.2g



After following the above tightening sequence the build platform will move much easier and this can be verified by now turning the torque coupling again and feeling a reduced amount of force needed.



There will always be some drag as this is calculated to remove play and slop in the system.

If you are not satisfied, you can do the procedure again

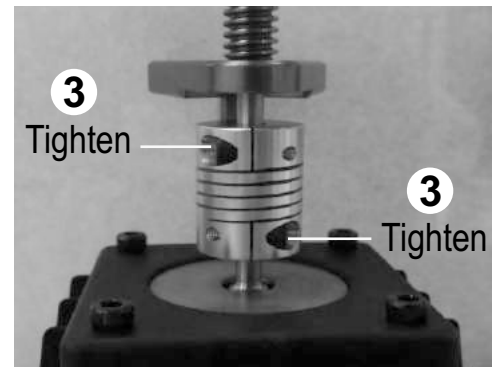
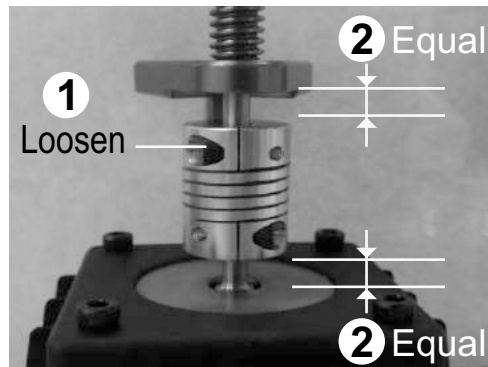
Try turning the torque coupling again after the above procedures

2.2

<13>

Now that the first components are trammed we need to secure the torque coupling to the stepper motor.

Loosen the coupling from the lead screw and slide it down so that there is an equal distance top and bottom from the lead screw and motor (shown below).



Then tighten both ends of coupling

Great job up to this step!

2.3

<1>

Next we are going to install the side panels. The side panels have a few things we need to pay special attention to.

Both sides have the forward print platform vertical rods. This requires us to install the side panel by sliding them down from the top.

The left panel (DSA3302-U06) has the A/C receptacle that needs to be attached from the inside using some screws and nuts before we slide it down making installation easy to get to.

Find the following accessories from: Box-G



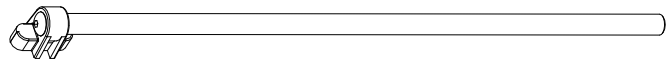
SCW0153
(TB3x12)
x2



SCW0157
(TM4x12)
x2



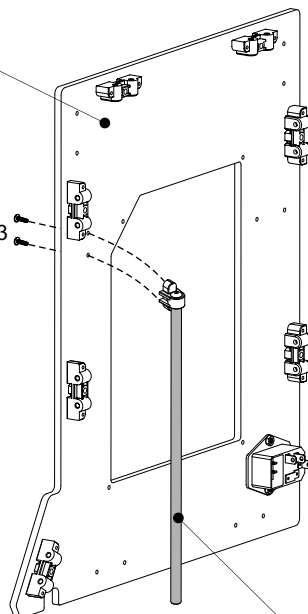
MDT0139
Nut
x2



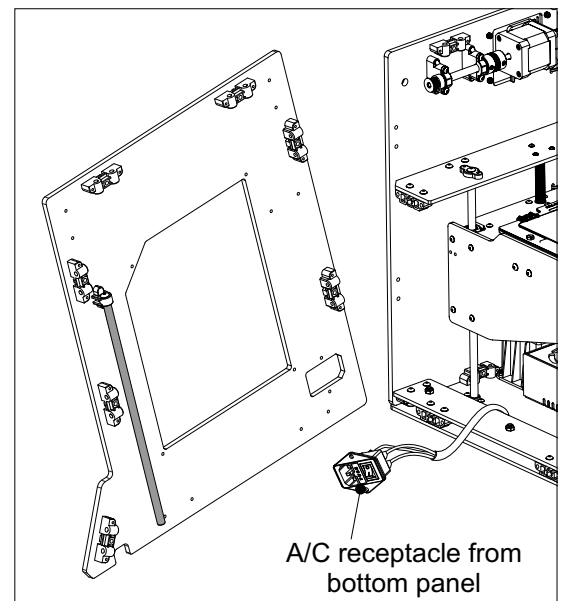
Pre-assembled Rod
(for Left and Right panels)
x1

DSA3302-U06
Left panel
from Box-F

SCW0153
x2



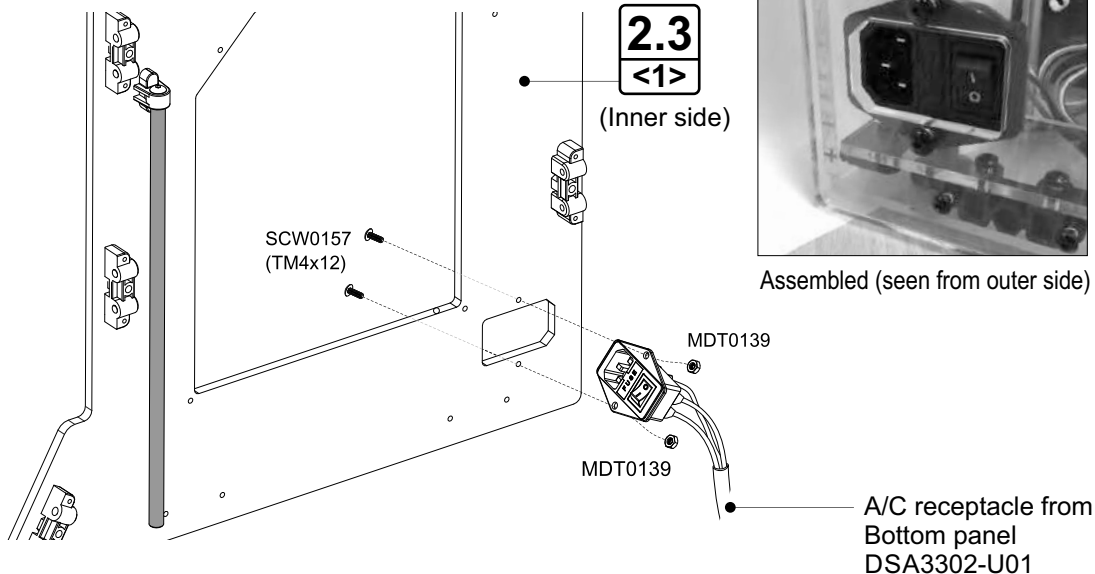
Pre-assembled Rod
(for Left and Right panels)



Place Side panel close to printer bottom
so we do not pull or damage the AC wires
from the power supply

2.3**<2>**

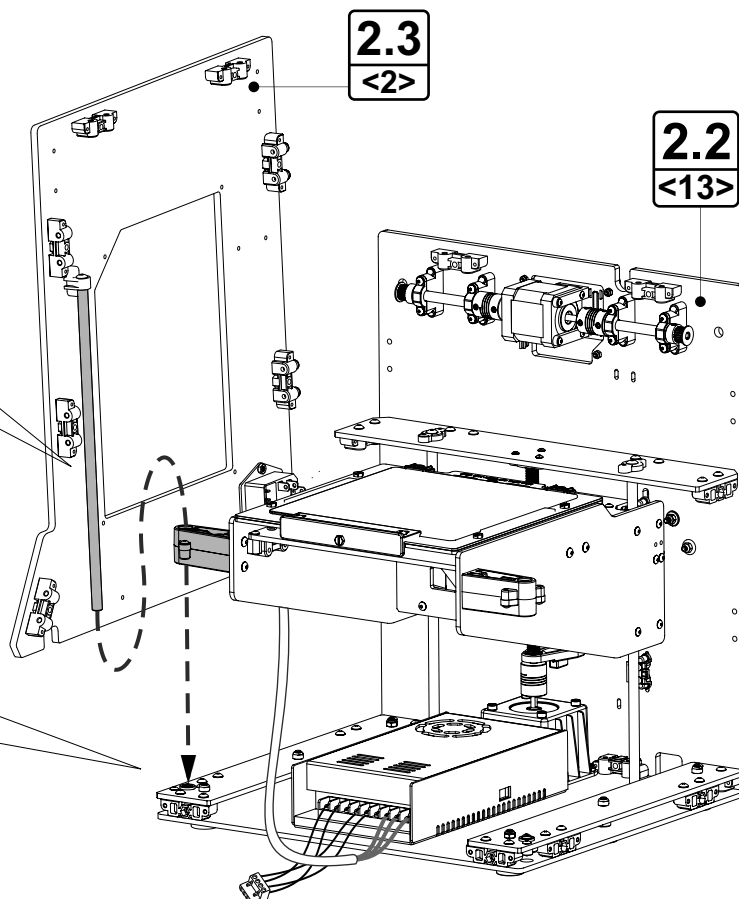
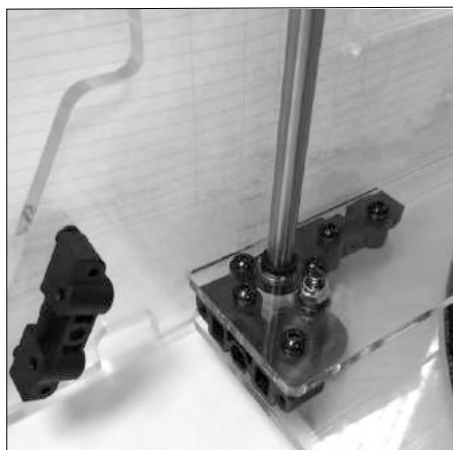
Put the two screws (SCW0157) in from the outside of Left panel (DSA3302-U06) and then slip the power receptacle over the exposed screws from the inside and install the nuts (MDT0139) as shown below.



NOTE: the switch goes toward the front of the printer and the tapered side toward the rear matching the panel cutout.

2.3**<3>**

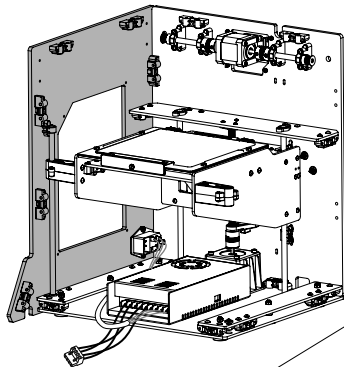
With the power switch / receptacle installed in the panel, it's time to install the left panel by carefully sliding the vertical rod down the front print platform bearing (pictured below right) and making sure the rod aligns with its lower mount (pictured below right bottom).



2.3

<4>

Left panel installation



Find the following accessories from: [Box-G](#)



SCW0153
(TB3x12)
x6



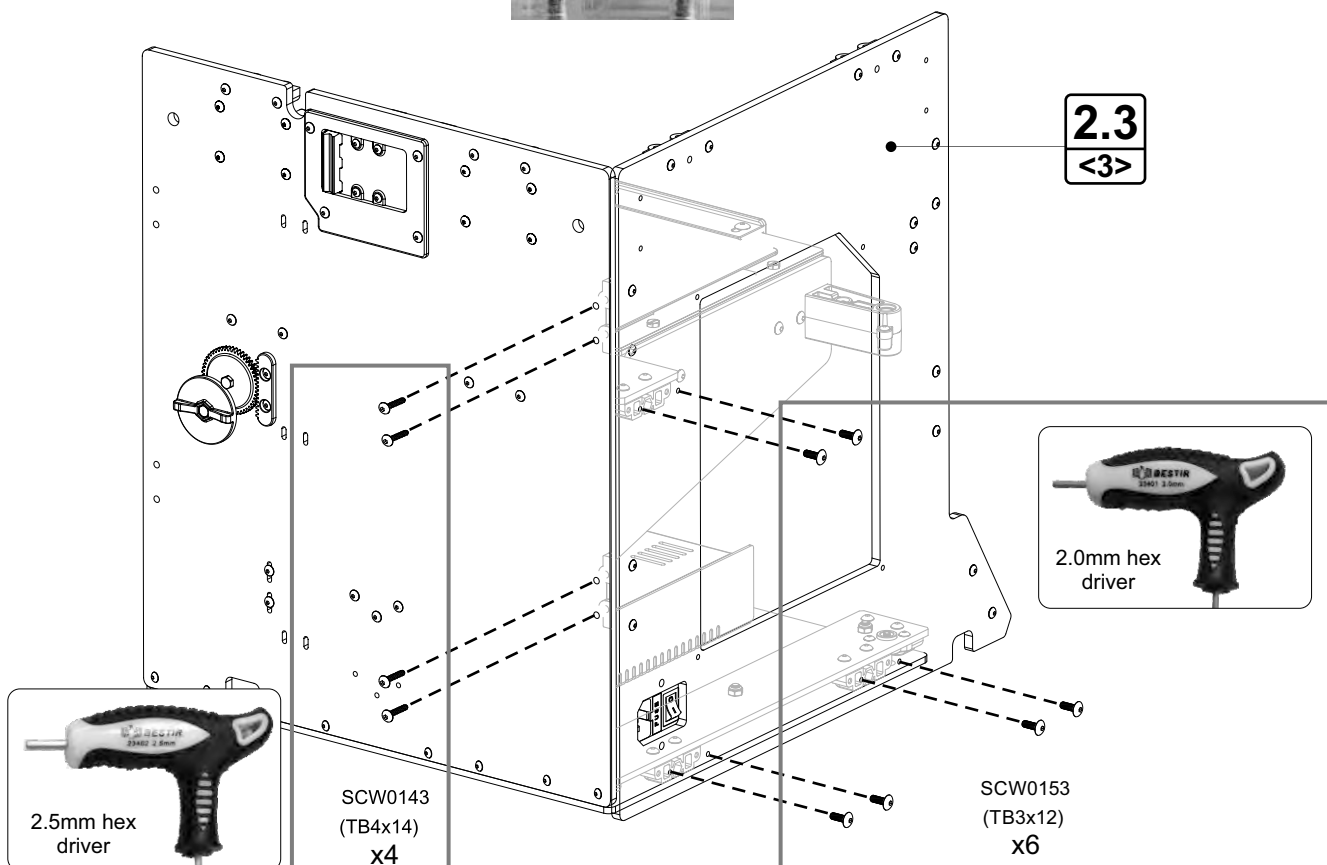
SCW0143
(TB4x14)
x4

Loosely install these screws without tightening them as we need to align and tram the rods later (Example on the right).



2.3

<3>



2.3

<5>

Now check to make sure no wires are loose or damaged to the Switch / Power receptacle to the power supply. Now well, we have easy access to the power supply, let's set the voltage.



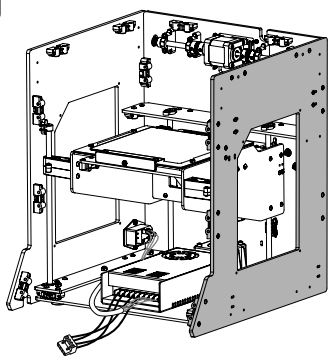
Power from your home outlet varies depending on where you live, for example, the USA is 110V while Hong Kong is 220V. There is a switch on the right side of the power supply marked 110-220V (see above picture).

Set this switch to the appropriate position for your region. If you are unsure about any of the above steps or specification consult with a qualified professional electrician.

2.3

<6>

Right panel installation



Find the following accessories from: Box-G

SCW0153
(TB3x12)
x8

SCW0143
(TB4x14)
x4

SCW0157
(TM4x12)
x4

Pre-assembled Rod
(for Left and Right panels)
x1

DSA3302-U05
Right panel
from Box-F

SCW0153
x2



Pre-assembled Rod
(for Left and Right panels)

2.3

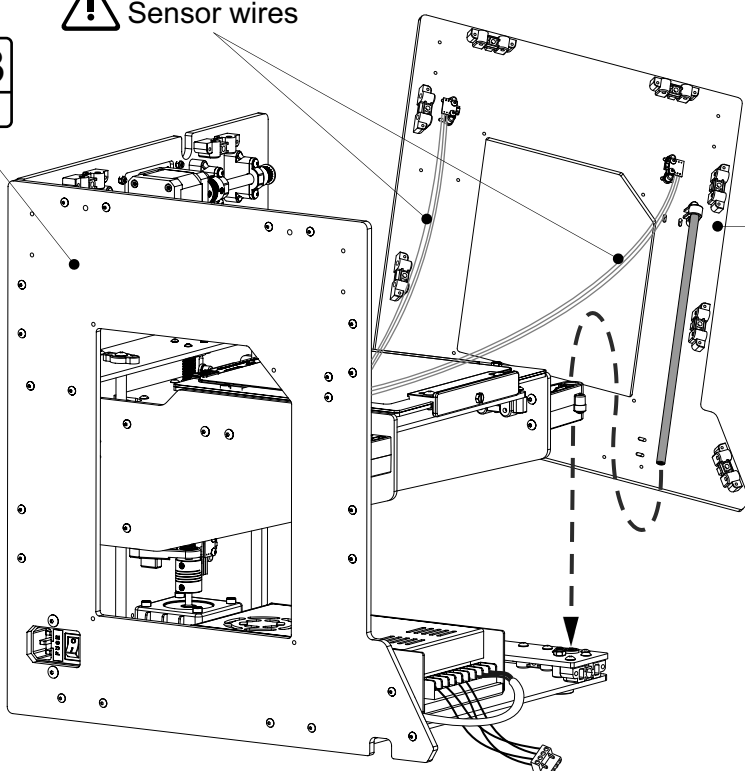
<7>

Great job! Let's move on to the right side panel. This one is easier than the left side, we will install it in the same way as the left and loosely install the screws as we did on the right.

! Sensor wires

2.3
<4>

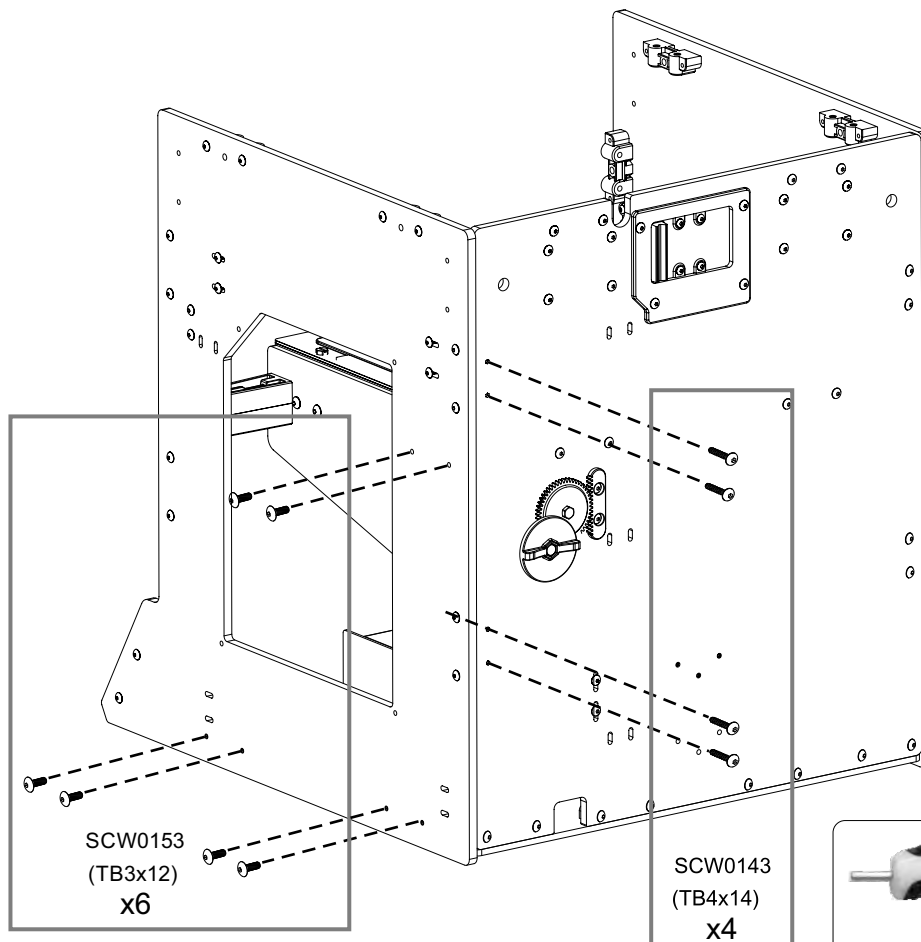
2.3
<6>



Make sure as you are installing the right panel the sensor wires do not get pinched or caught on anything

2.3

<8>



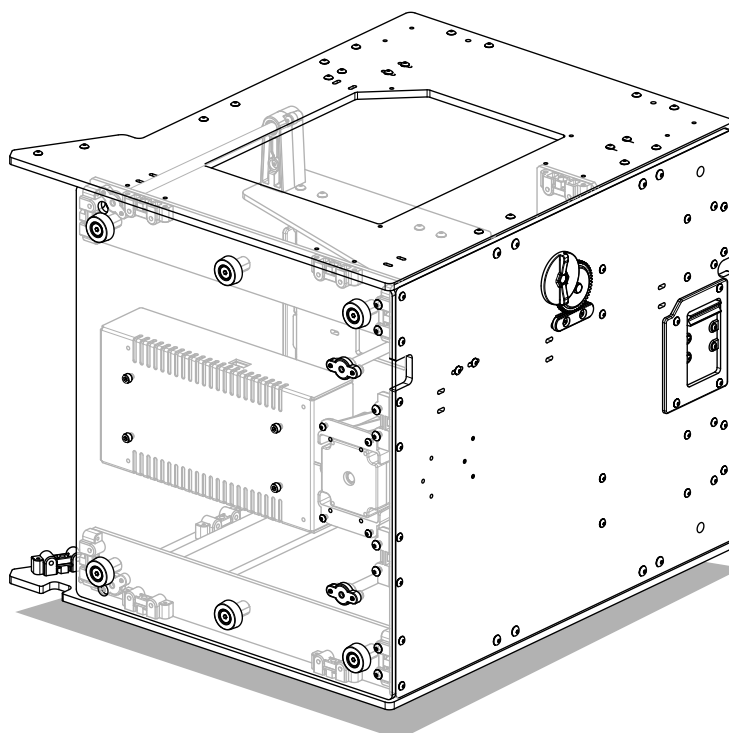
Loosely install these screws without tightening them as we need to align and tram the rods later (Example on the right).



2.3

<9>

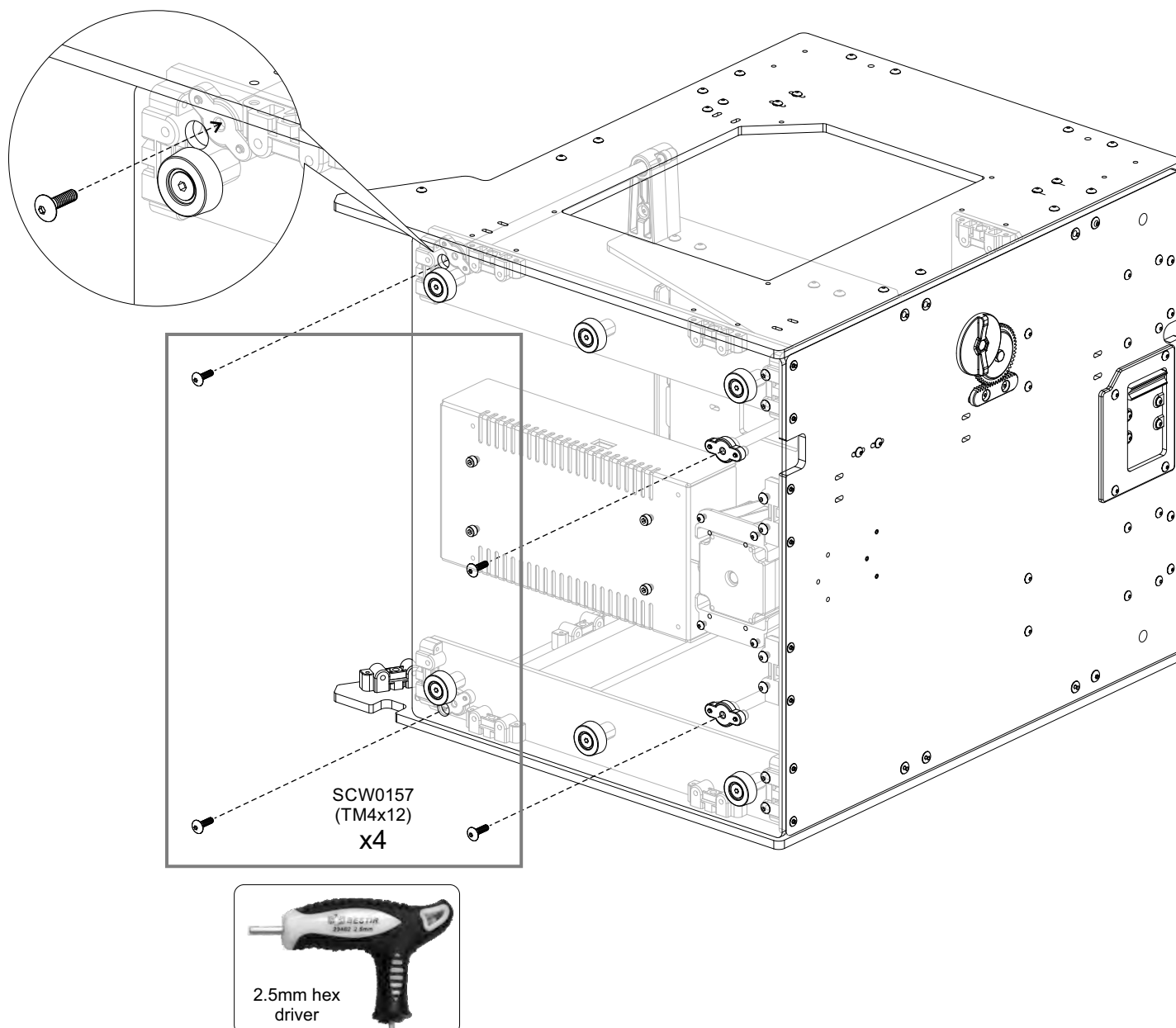
With the panels loosely installed carefully lay the printer on it's side



2.3

<10>

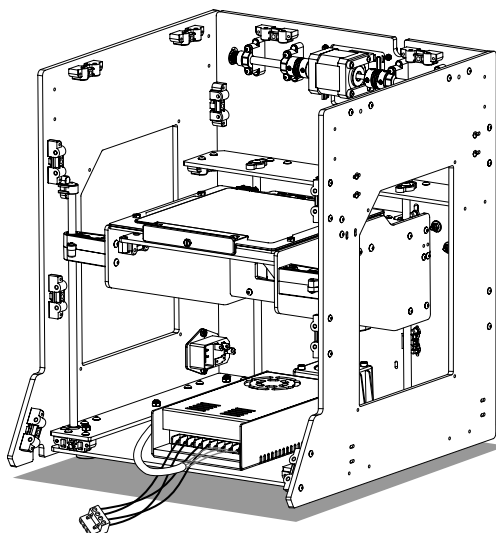
Now we need to install the lower rod securing screws SCW0157 (see below diagram). **Tighten these screws all the way** as they will start to be the alignment points for tramping the frame later.



2.3

<11>

We are done with the bottom so let's turn the printer back upright. Great job so far, let's move on to next step.

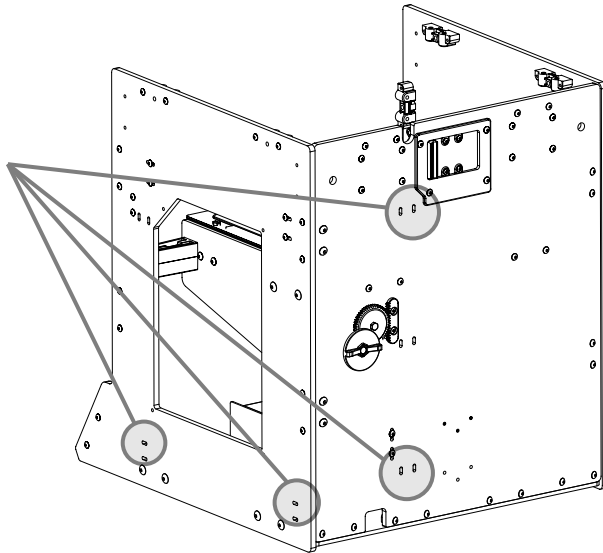


2.4

<1>

We need to tidy up the wiring a bit before we move on. There are cutouts in the panels that allow zip tie to pass through and secure the wiring. Loosely install zip ties in these slots so we can start roughing the wires through the loops.

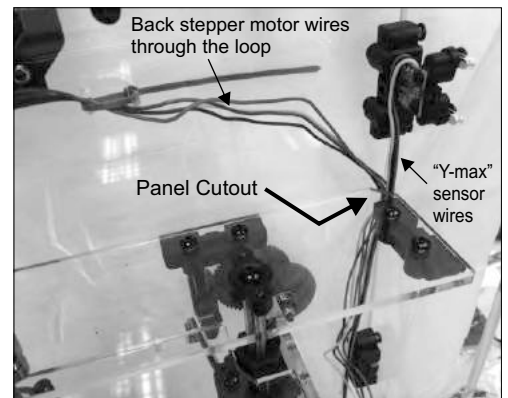
These zip tie slots will be used



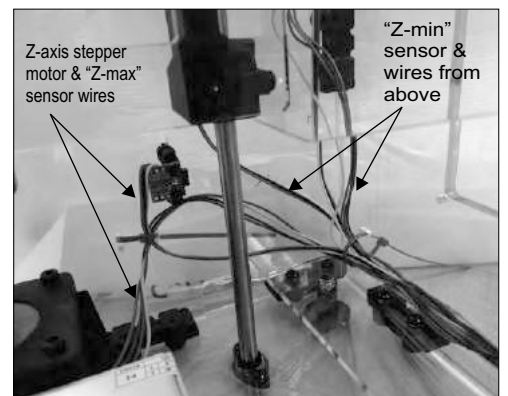
Routing the wires

1. Start by routing the **Y-axis stepper motor wires** (through the loop), and the **"Y-max" sensor wires** down the **back right corner** cutout (picture 2.4a).
2. Next route the **Z-axis stepper motor wires** and **"Z-max" sensor wires** (through the loop), together with the wires down from the back right corner and through another loop (picture 2.4b).
3. Next route the **"Y-min" sensor wire**, together with all the wires from **point 1** and **point 2** mentioned above through the loop near the front. Leave the loops loose as we will have more wires to pass through later (picture 2.4c).

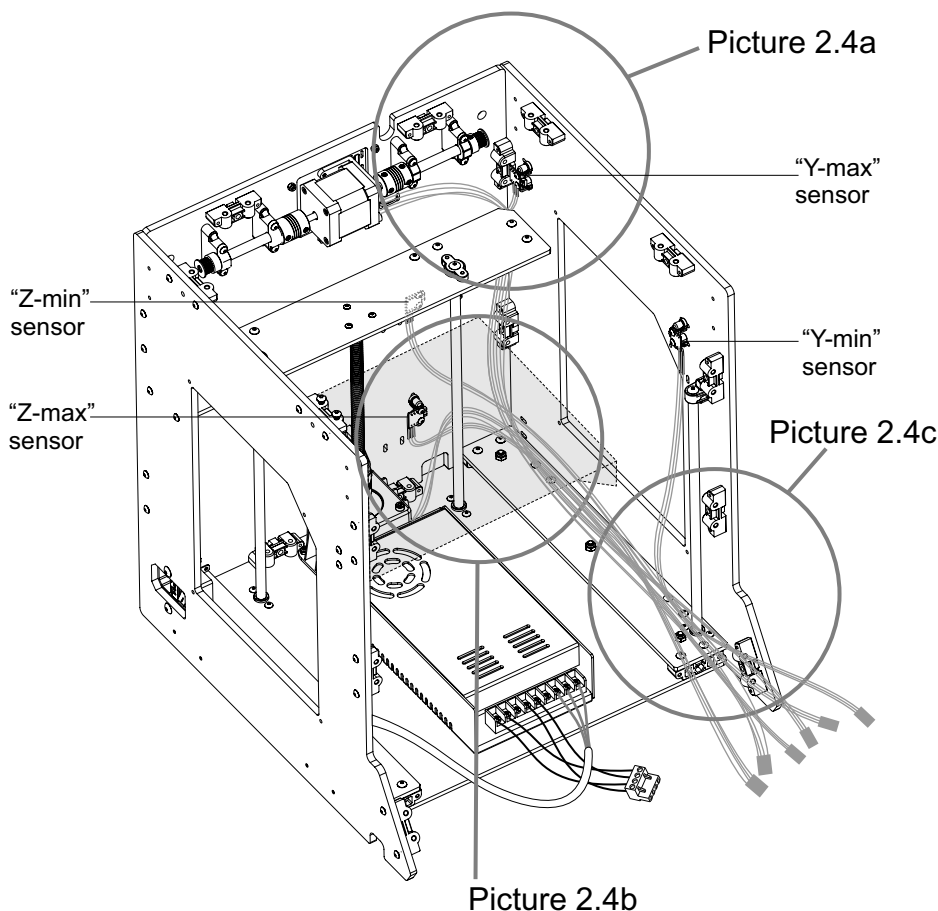
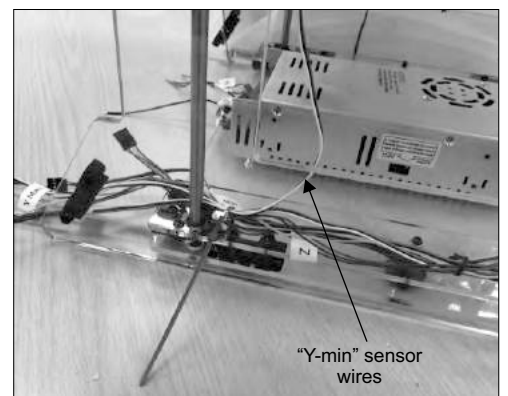
Picture 2.4a



Picture 2.4b

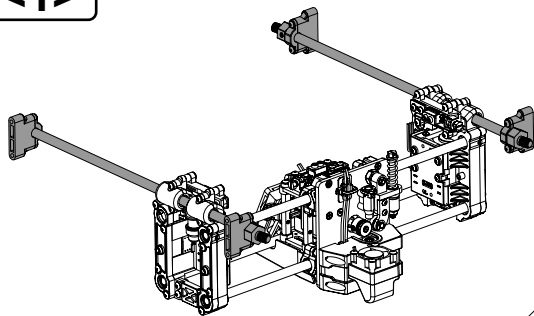
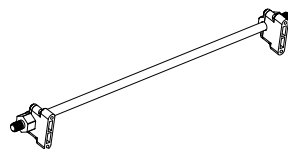


Picture 2.4c

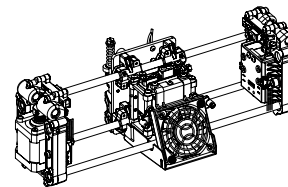


2.5

<1>

Find the following accessories from: Box-A

DSA3302-U15
Gantry rail (Y axis rod)
x2



DSA3302-U14
X axis gantry
x1

We need to install the Y axis rods onto the X axis gantry and then install the XY gantry to the rear and side panels

Remove the protective plastic from the side rods, then remove the rod adapter washer and rod support, by losing the set screw (see below diagram).



Loosen this set screw on adapter



2.0mm hex
driver

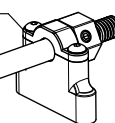
MDT0146
MST0621
Rod adapter

Unscrew at one end

DSA3302-U15

x 2

DSA3302-U18

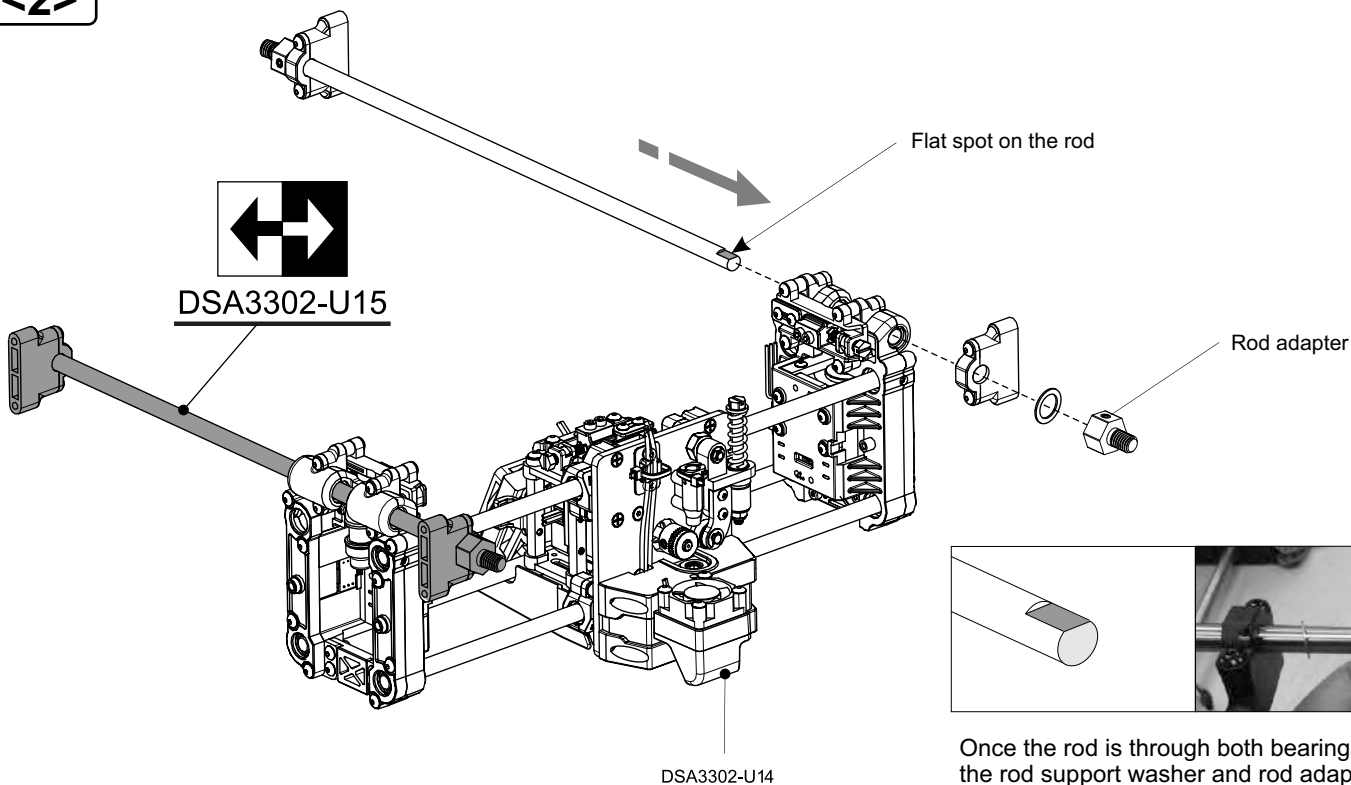


MST0623

2.5

<2>

Now carefully slide the rod through the two support bearings on the X axis gantry (see below diagram and picture). The direction and side is not important as both sides are the same

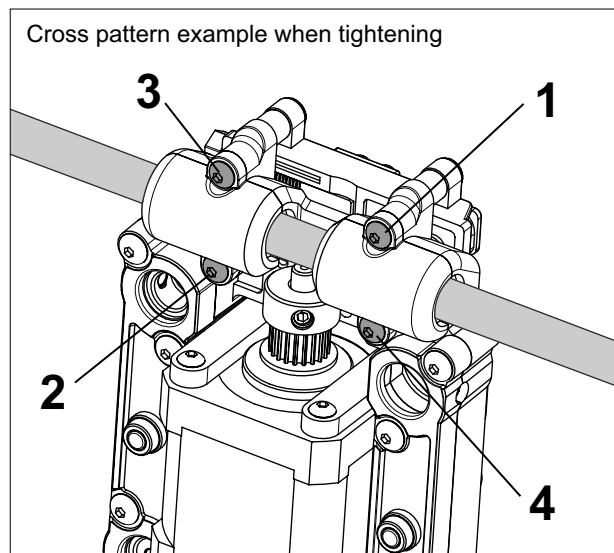
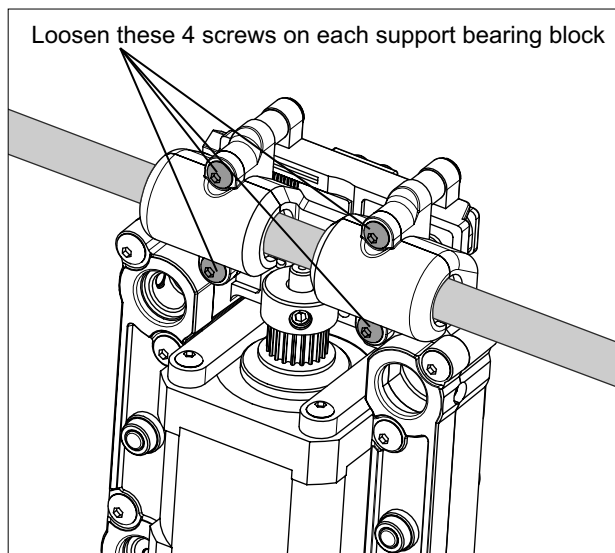


Once the rod is through both bearings, reinstall the rod support washer and rod adapter (note the flat spot on the end of the rod. This lines up with the set screw on the rod adapter while tightening)

2.5

<3>

Now we need to align the bearings by loosening the 8 cap screws (indicated below left) and tighten them in a cross pattern (below right).

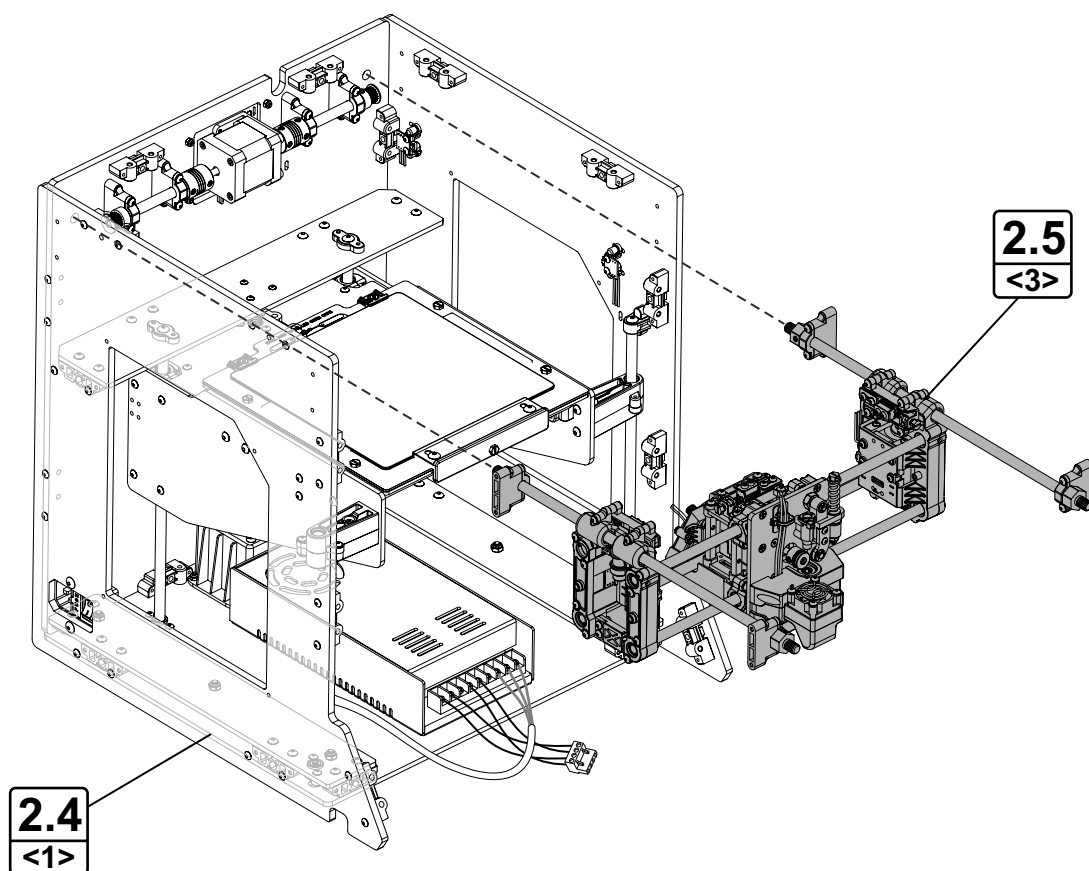


Now repeat this procedure on the other support bearing block

2.6

<1>

Now let's install the gantry in the frame by loosely installing the 8 screws (SCW0153) and 2 nuts (MDT0140) to the rod supports.

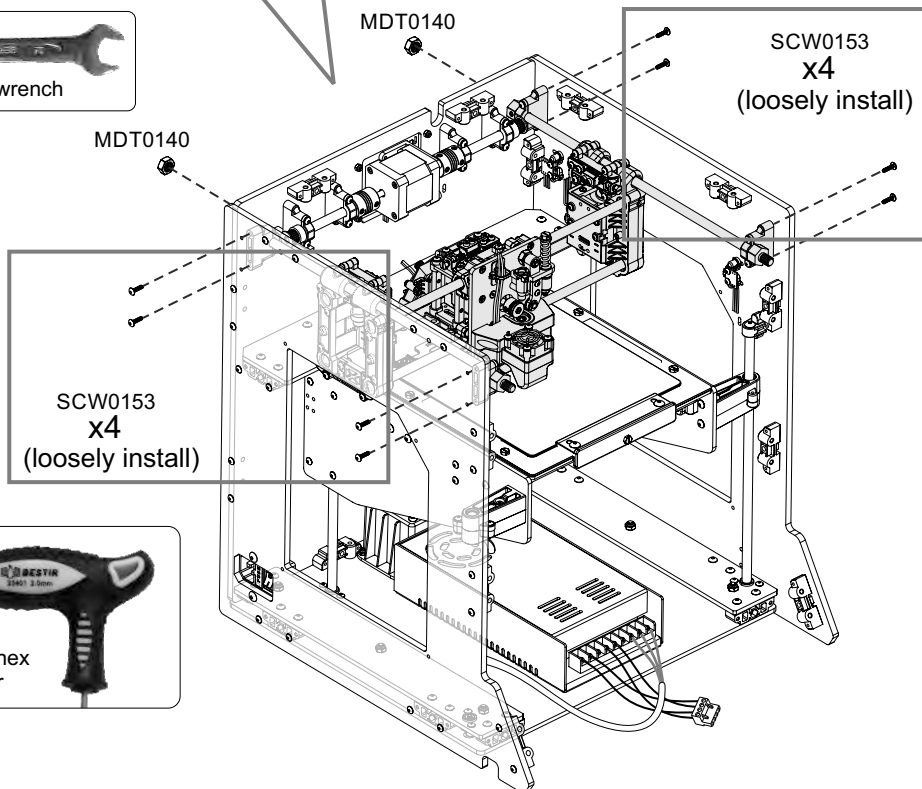
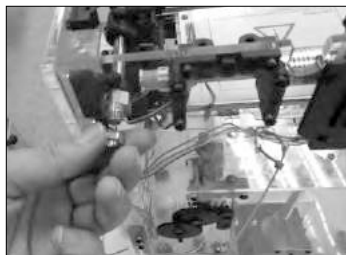


2.6

<2>

It helps to align the rod supports parallel to the side panel before sliding it down. (Note the extruder head goes toward the front and the fan toward the rear).

Loosely install MDT0140 (2pcs) with 12mm wrench at the back

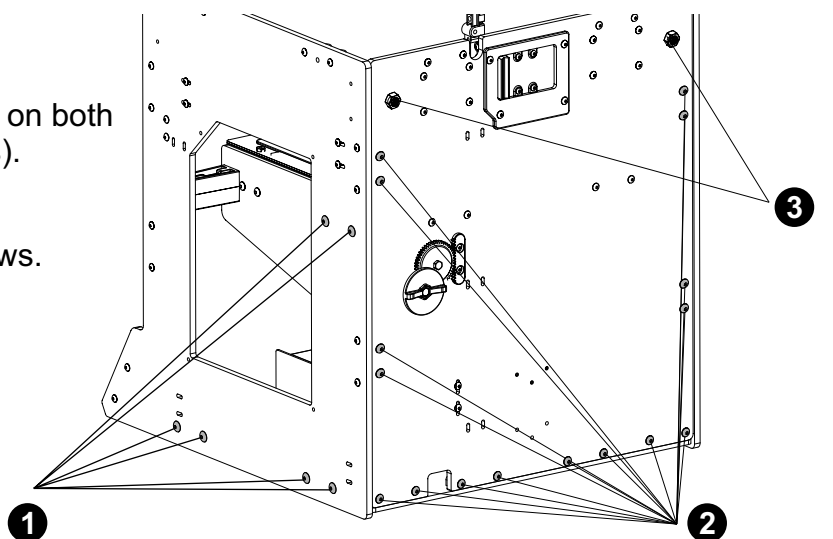


2.6

<3>

Next we need to tighten the side panel screws and back panel screws that we left loose on the previous steps

- 1 Start with the side panel screws on both sides (not the gantry rod screws).
- 2 Next tighten the rear panel screws.

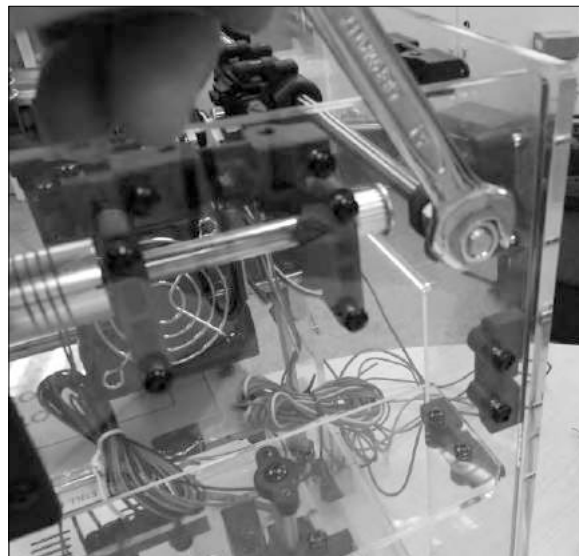
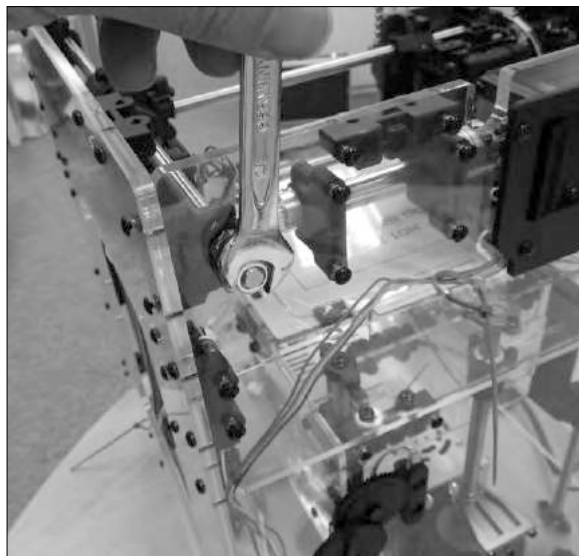


Tighten these side screws (we left loose earlier) on **BOTH left and right panels**

Tighten these side screws (we left loose earlier) on back panel

2.6**<3>**

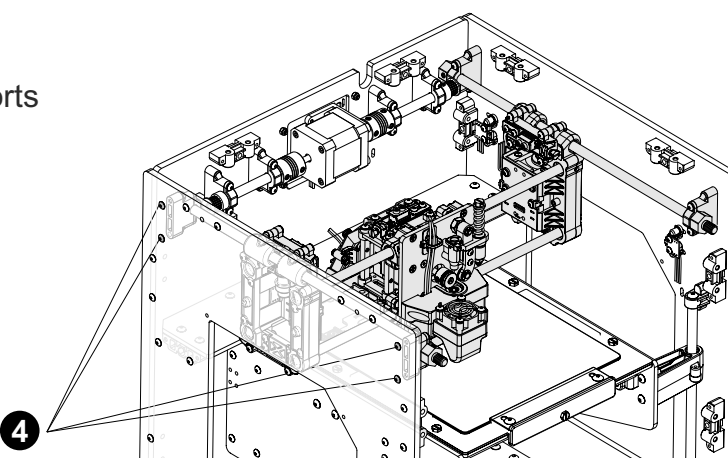
- ③ Then tighten gantry rod adapter nuts on the back.



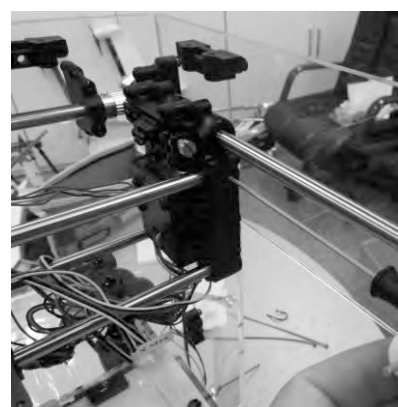
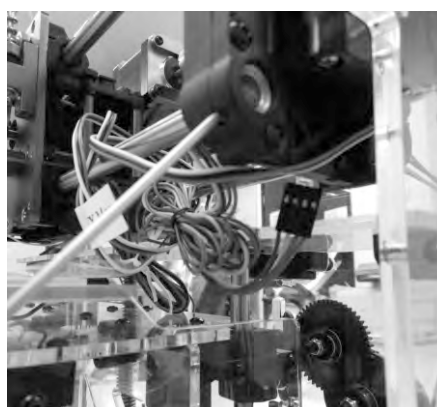
- ④ Followed by the side rod supports



Rod support screws
(on **BOTH Left and Right panels**) ④

**2.6****<4>**

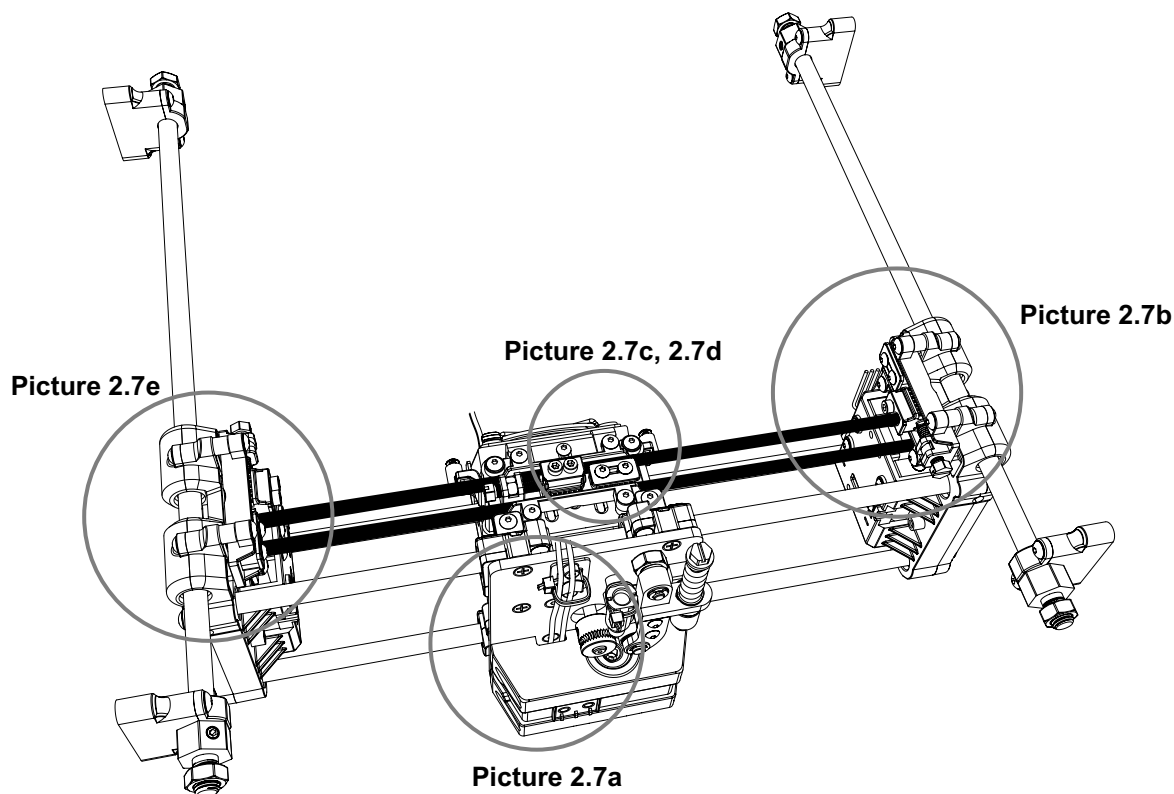
The gantry should glide back and forth and left and right if necessary an adjustment to the inner gantry rods can be made to adjust the X axis length by losing the 3 rod set screws (shown in below pictures) and sliding the gantry to the rear and adjusting till smooth and re-tighten the 3 set screws.



2.7

<1>

The next step is to install the X-axis drive belt. Find the bag with 3 belts in Box-G. There are 2 short belts and 1 long belt, we need to long belt for this step.



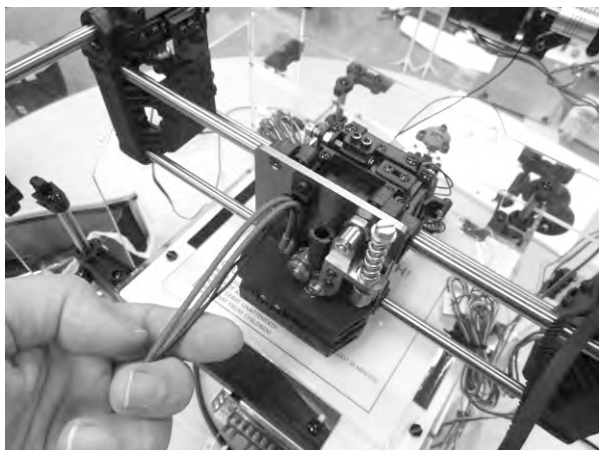
Find the following accessories from: [Box G](#)

Timing belt (Long)
ETP0110



Start first by laying the wires coming from the extruder head to the front of the printer to give an unobstructed access to the belt area (**picture 2.7a**).

We need to route the belt around the motor sprocket with the long side toward the back and the short end toward the front. The ribs of the belt are toward the inside or face each other (**picture 2.7b**).



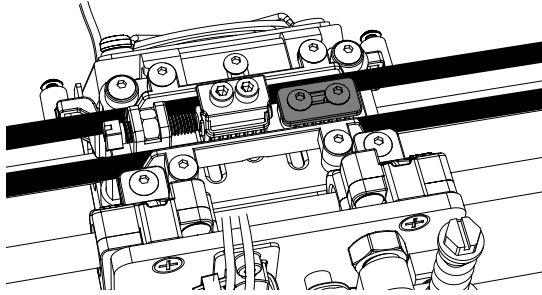
Picture 2.7a



Picture 2.7b

2.7**<1>**

Now remove the screws on the right belt lock and lift up on the lock. Slip the belt into the lock with ribs, matching the slots on the lock and the end of the belt flush with the end of the lock (**picture 2.7c and 2.7d**).

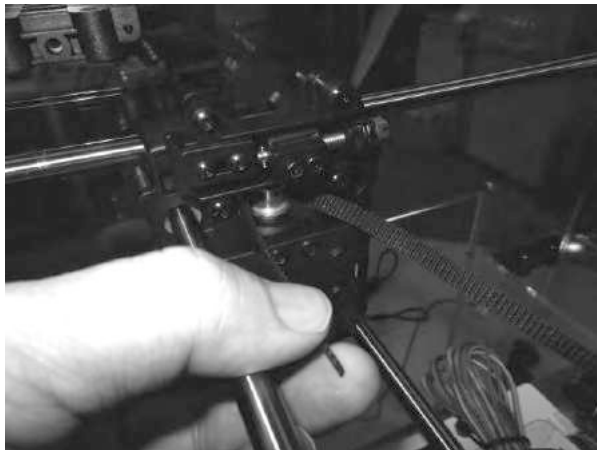


Picture 2.7c



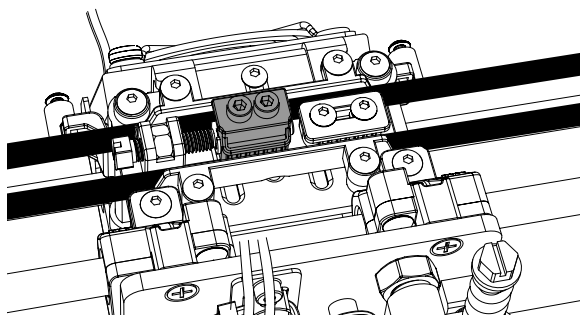
Picture 2.7d

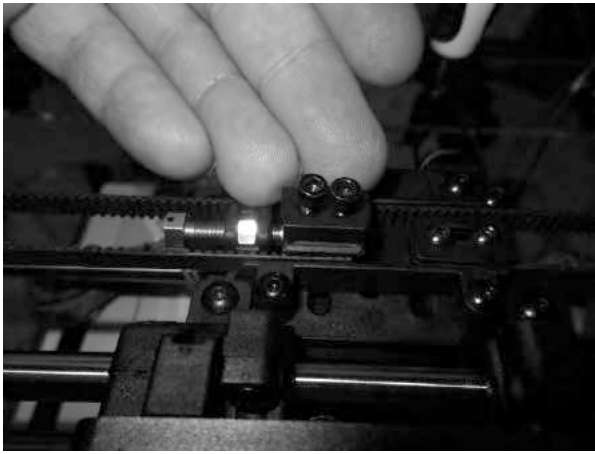
Slide the lock down and reinstall the screws. Run the other end of the belt through the guide block and around the pulley on the left side (**picture 2.7e**).



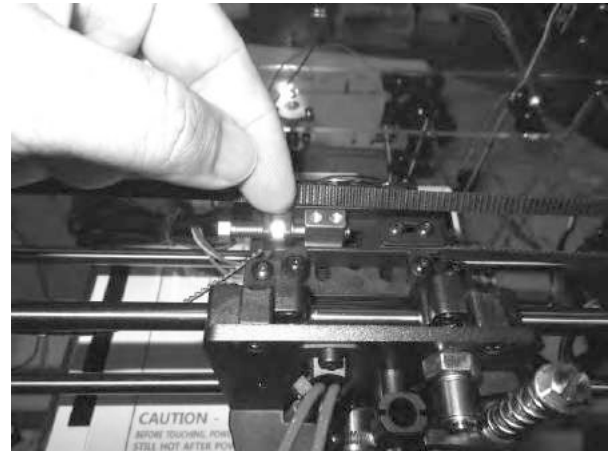
Picture 2.7e

Remove the 2 screws holding the tension lock (**picture 2.7f**) to the adjusting screw and lift up. Now, turn the adjusting screw till the tension lock is all the way to the left (**picture 2.7g**).





Picture 2.7f

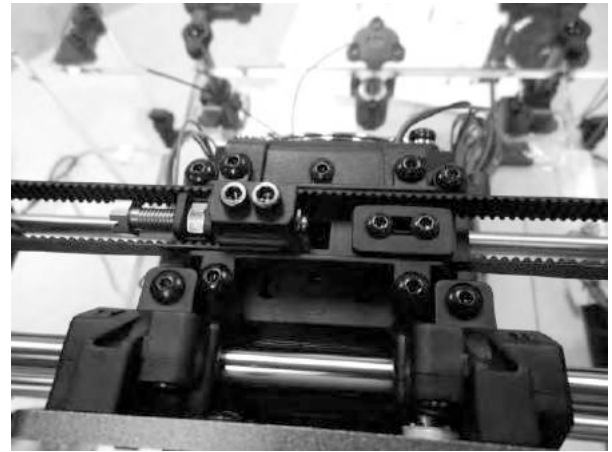


Picture 2.7g

Lay the ribs of the belt in the tension lock. Lock the ribs to the slots just like the other side (**picture 2.7h**). Slide the lock down and secure the two screws. Now slowly slide the X-axis back and forth making sure the belt is moving freely around the motor and pulley and in the guide block (**picture 2.7i**).

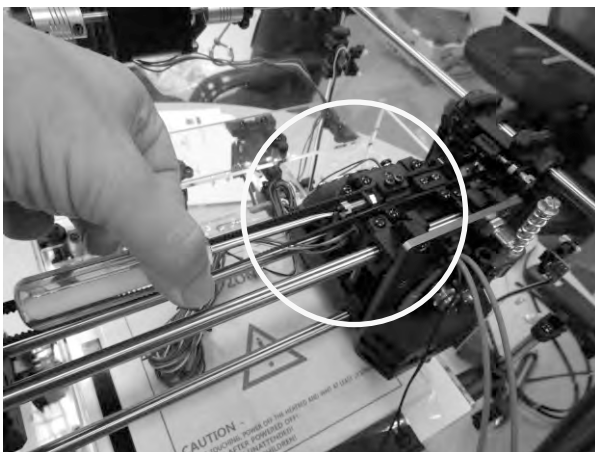


Picture 2.7h



Picture 2.7i

We need to adjust the tension on the belt now. Slide the extrusion head to the far right. Now slowly turn the tensioning screw (**picture 2.7j**) till the belt, when twisted to 90 degrees, feels slightly tight (**picture 2.7k**).



Picture 2.7j



Picture 2.7k



WARNING: DO NOT OVER TIGHTEN THE BELT

The belt is a timed belt (i.e. it has teeth like a gear so it will not slip so they do need as much tension as a friction belt

2.8

<1>

We need to run all the wiring for the control panel now before we install the front and top panels.

First, we need to bundle the top wires together and install an anti-chafe loom (spiral cut cable loom) around them.

Find the following accessories from: Box G

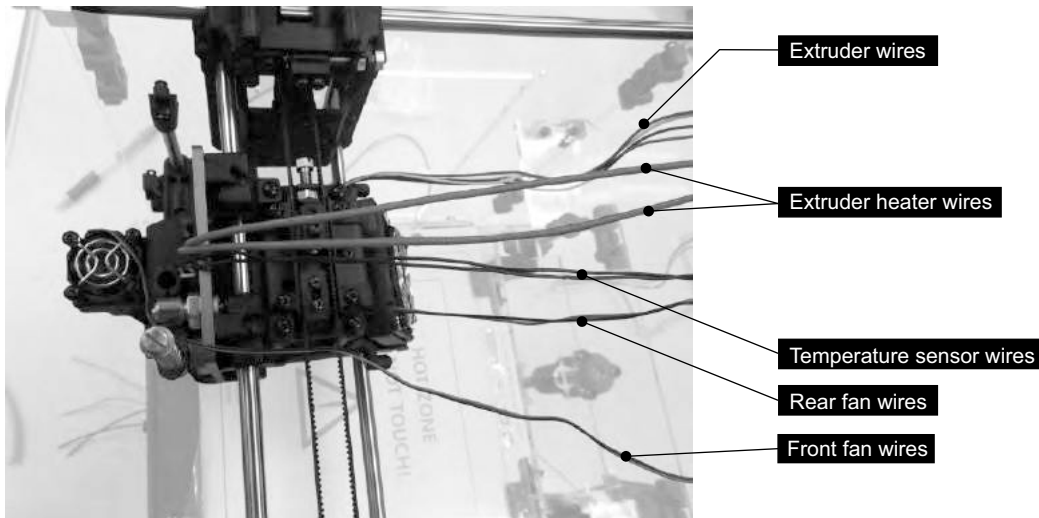


Zip tie



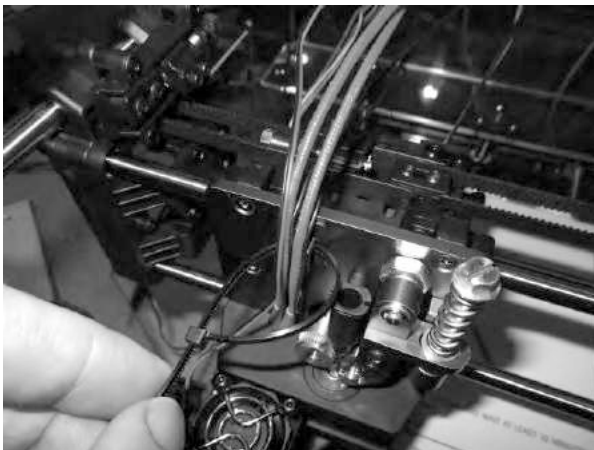
Spiral cut cable loom

Referring to the **picture 2.8a** we need to gather the front fan wires (thin wires from the front fan that magnets on), extruder heater (thick red wires), temperature sensor (thin black wires coming from the extruder cover by the thick red wires), extruder wires (multi-colored 4 wires), and the rear fan (thin red and black).

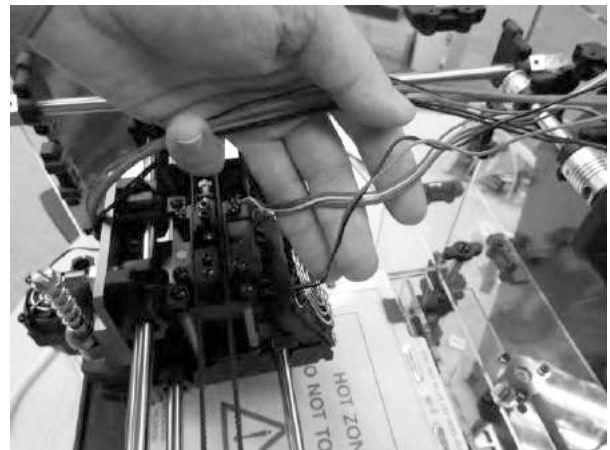


Picture 2.8a

First zip tie the front fan, extruder and temperature sensor wires to the extruder top plate (**picture 2.8b**). Bring them across the top, have the extruder motor wires and rear fan wires come up and join the other wires (**picture 2.8c**).

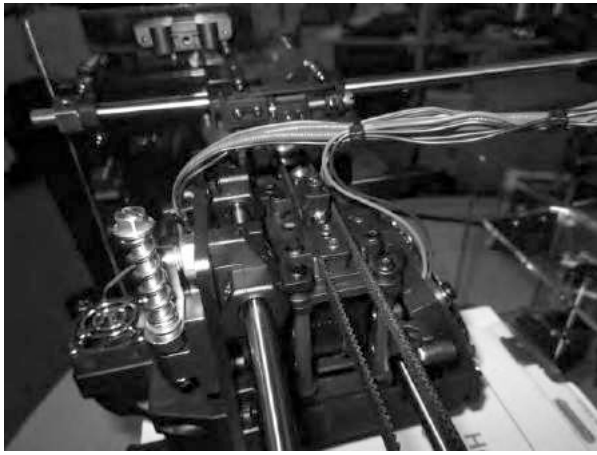


Picture 2.8b

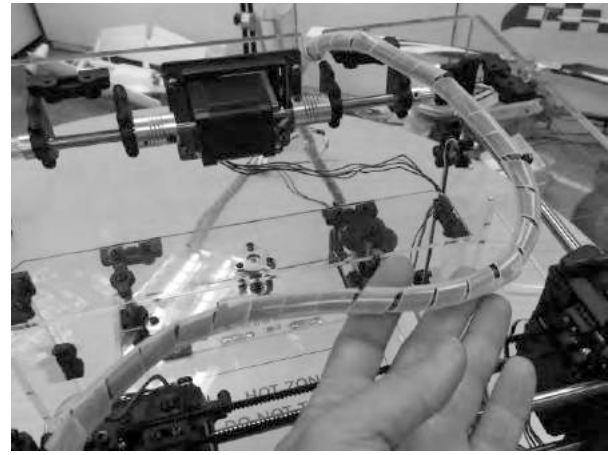


Picture 2.8c

Attach a few zip ties to hold them together and install the anti-chafe loom by wrapping the wires (**pictures 2.8d and 2.8e**)

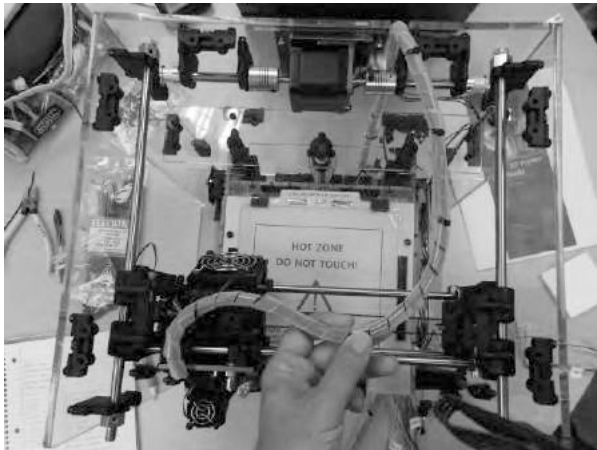


Picture 2.8d

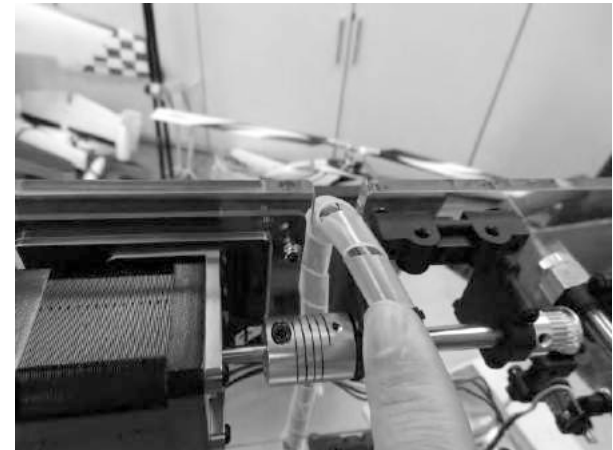


Picture 2.8e

Cut the anti-chafe loom 5 inches from the end of the wires. Now move the extrusion head to the front left position and lay the wire in the back panel slot, making an “L” shape (**picture 2.8f and 2.8g**). This “L” shape will give the required slack for the print head to move around and the wires not to bind.

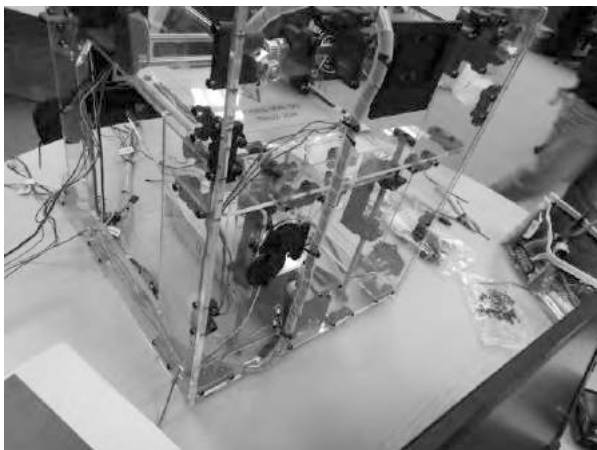


Picture 2.8f



Picture 2.8g

With the “L” shape in place zip tie the wire loom down the back side on the 3 points cut out for the zip tie on the back panel (**picture 2.8h**)

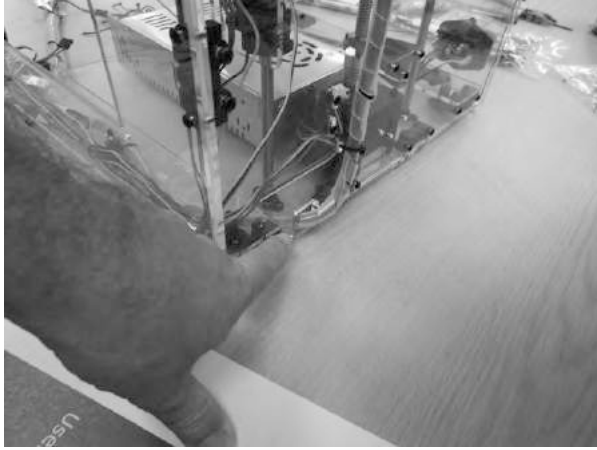


Picture 2.8h

2.8

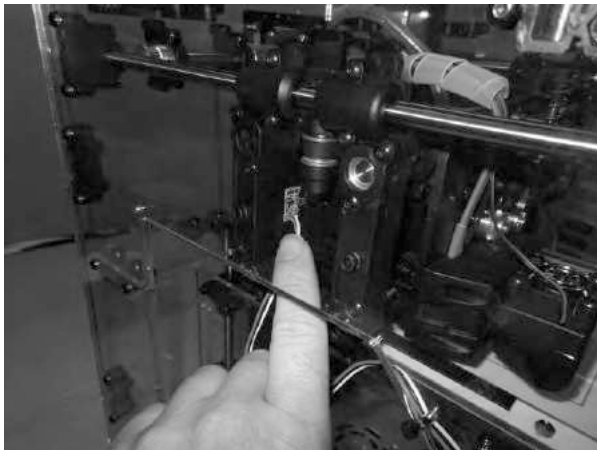
<1>

Feed the loom in the bottom slot and guide it around the back right rod and tuck it under the lower plate support (**picture 2.8i**) and bring it out the front.

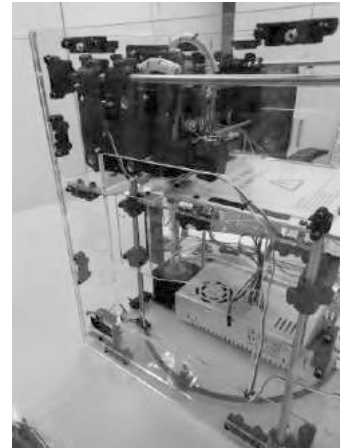


Picture 2.8i

Now slide the print head to the back and locate the sensor wire on the left side (**picture 2.8j**). Run the wires toward the front and down zip tying it to the left panel where noted in the picture (**picture 2.8k**).



Picture 2.8j

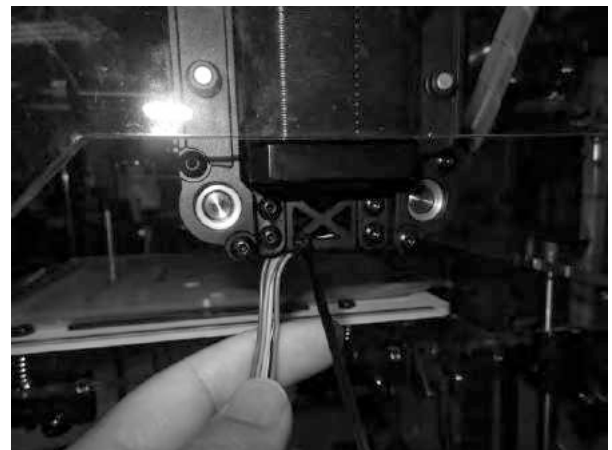


Picture 2.8k

Let's switch to the right side, we need to gather the side motor (X-axis) and the right sensor (**picture 2.8l**) and bring them down and zip tie them to the lower motor housing (**picture 2.8m**). Then, with the print head all the way to the back bring the wires to the front and down zip tie-in where noted in the figure.



Picture 2.8l

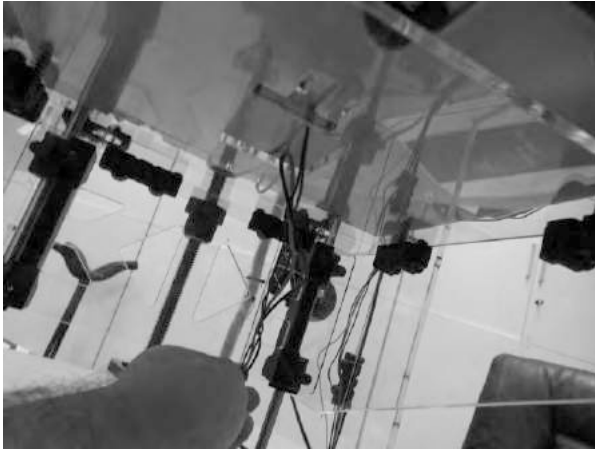


Picture 2.8m

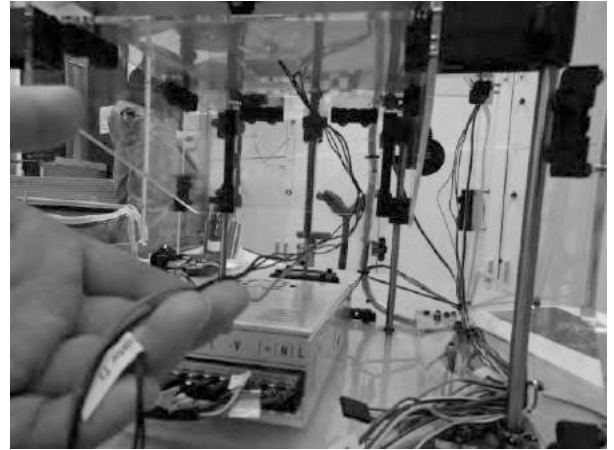
2.8

<1>

Next unbundle the wires from the bottom of the print hot plate and feed them through the most bottom right back cutout and bring them down and towards the front (**pictures 2.8n and 2.8o**)

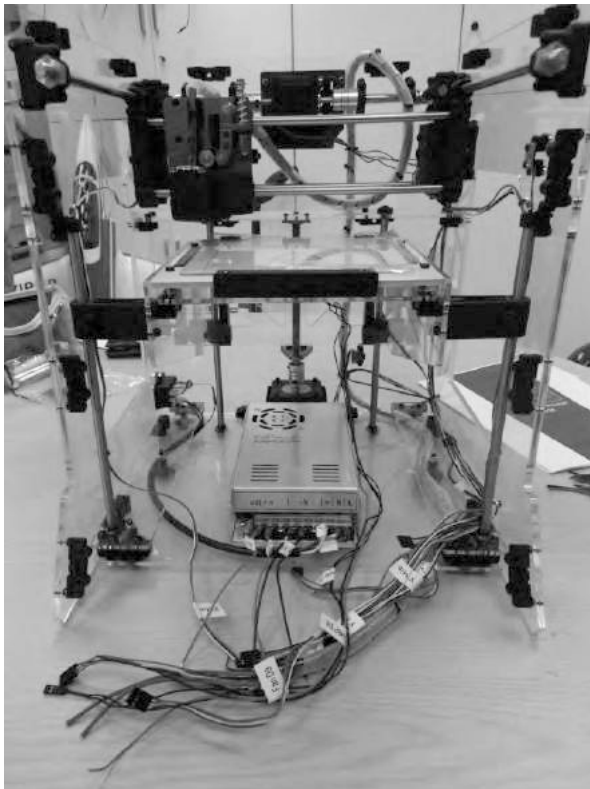


Picture 2.8n



Picture 2.8o

Now tighten the zip ties and tidy the wires up, making sure none of the wires bind or get pinched and all come out the front (**picture 2.8p**).

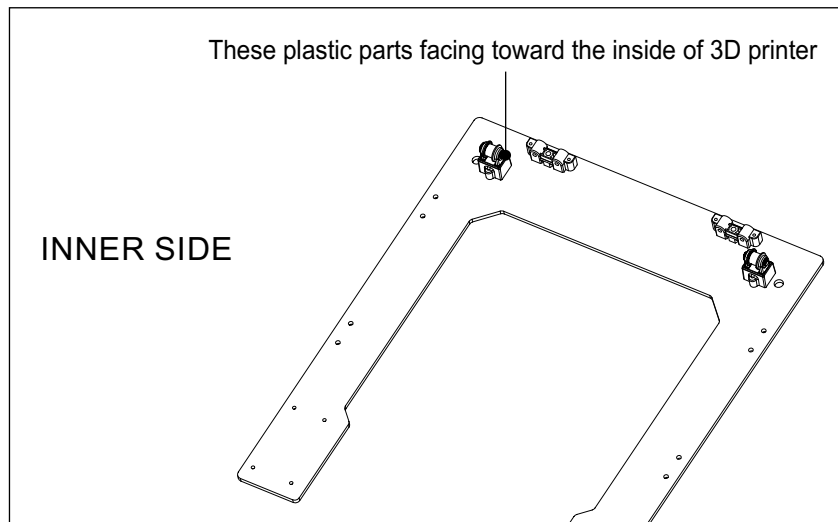


Picture 2.8p

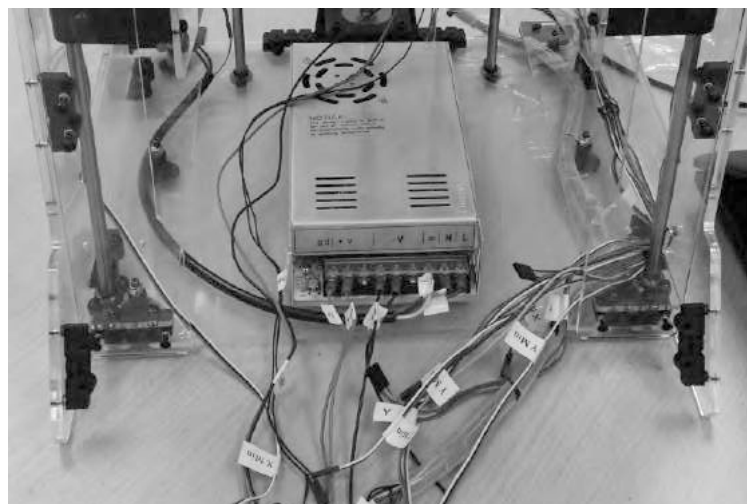
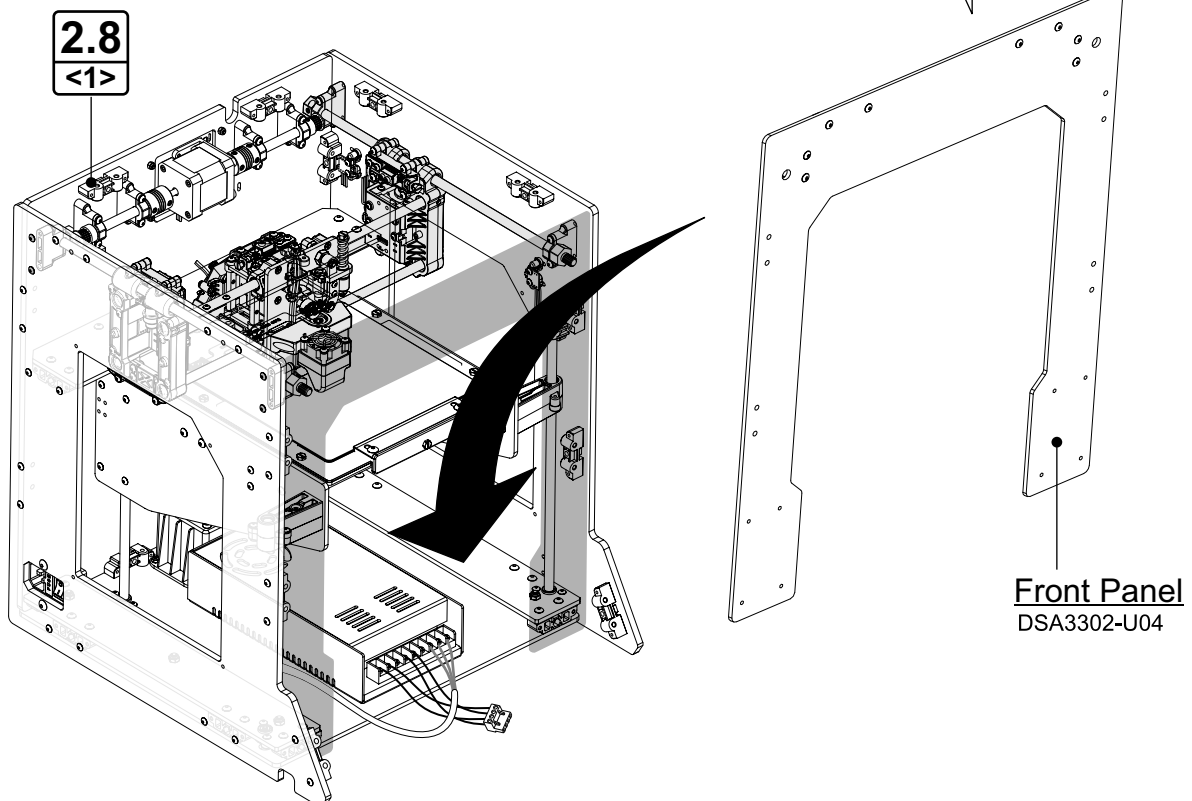
2.9

<1>

It's now time to install the front panel. Locate and slide in the front panel with the plastic parts facing toward the inside (picture 2.9a).



Picture 2.9a



Note: make sure not to pinch any wire in the front panel

2.9

<2>

Now locate SCW0153 (4pcs), SCW0143 (8pcs) screws and MDT0140 (2pcs) nuts.

Find the following accessories from: Box G



SCW0153
(TB3x12)

x4



SCW0143
(TB4x14)

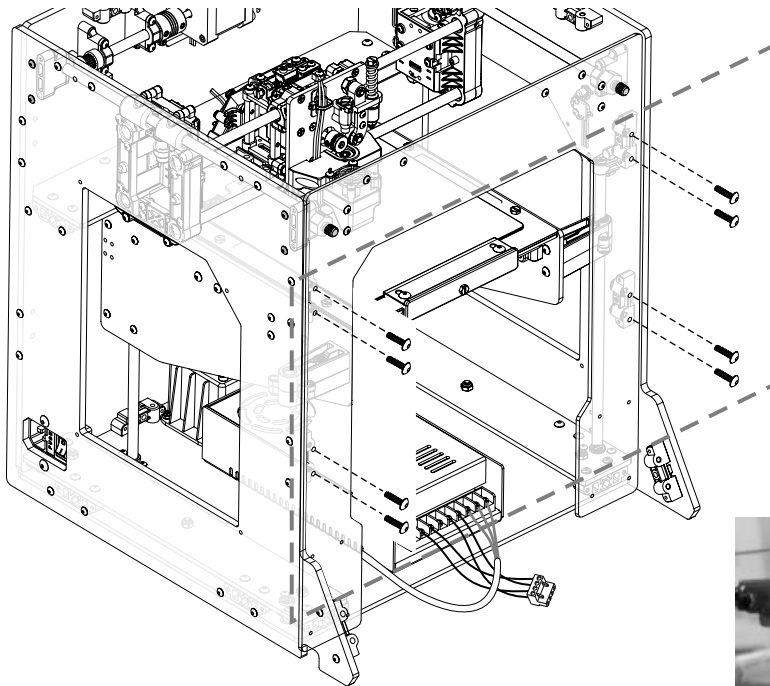
x8



Nut (silver color)
MDT0140

x2

Install all screws loosely first. Once all are installed, tighten them up and install the 2 nuts on the “Y” axis rods (**picture 2.9b**).



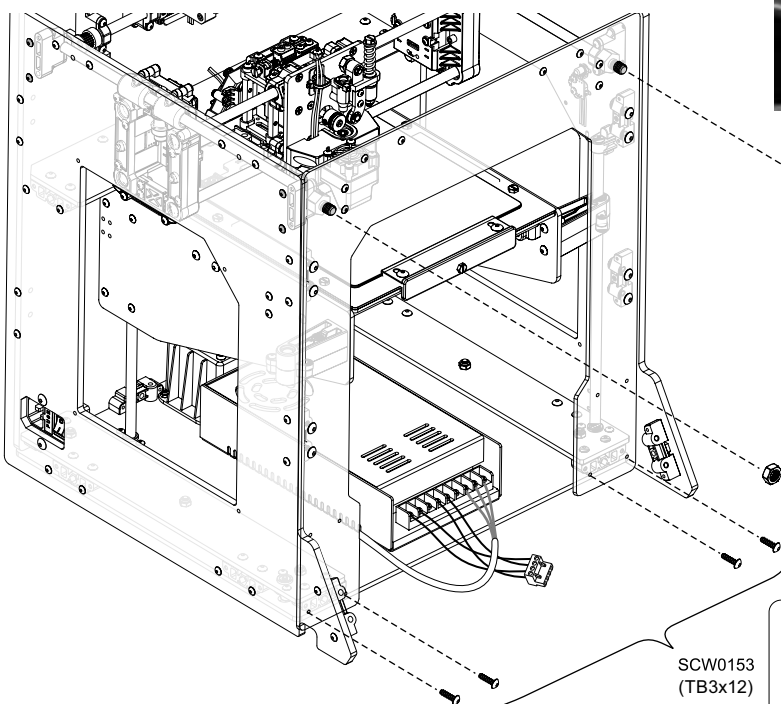
SCW0143
(TB4x14)



2.5mm hex
driver



Picture 2.9b



SCW0153
(TB3x12)

MDT0140



12mm wrench



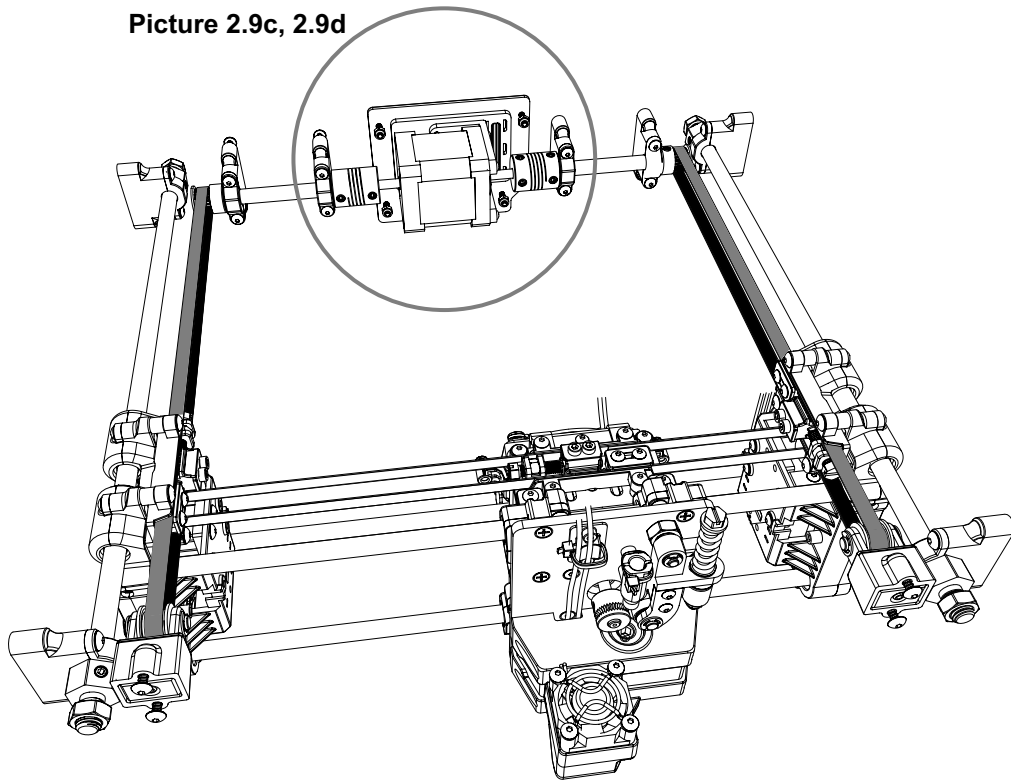
2.0mm hex
driver

2.9

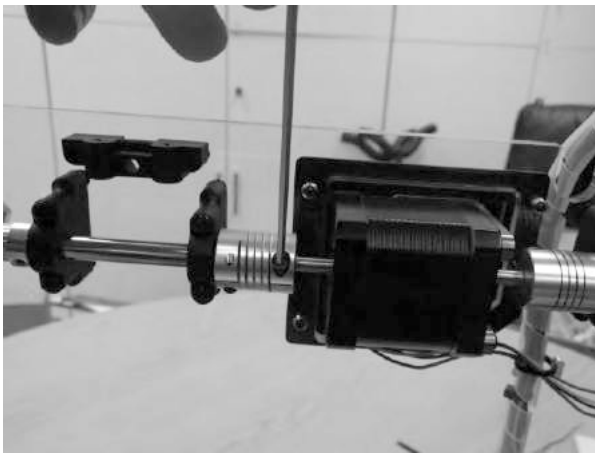
<3>

Next we need to install the “Y” axis belts and adjust them to each other.

Picture 2.9c, 2.9d



First, we need to loosen the set screws on the flex collars to free the shaft from each other. Do not remove the screws. Just loosen them so the collar can rotate independently from the motor shaft (**pictures 2.9c and 2.9d**)



Picture 2.9c



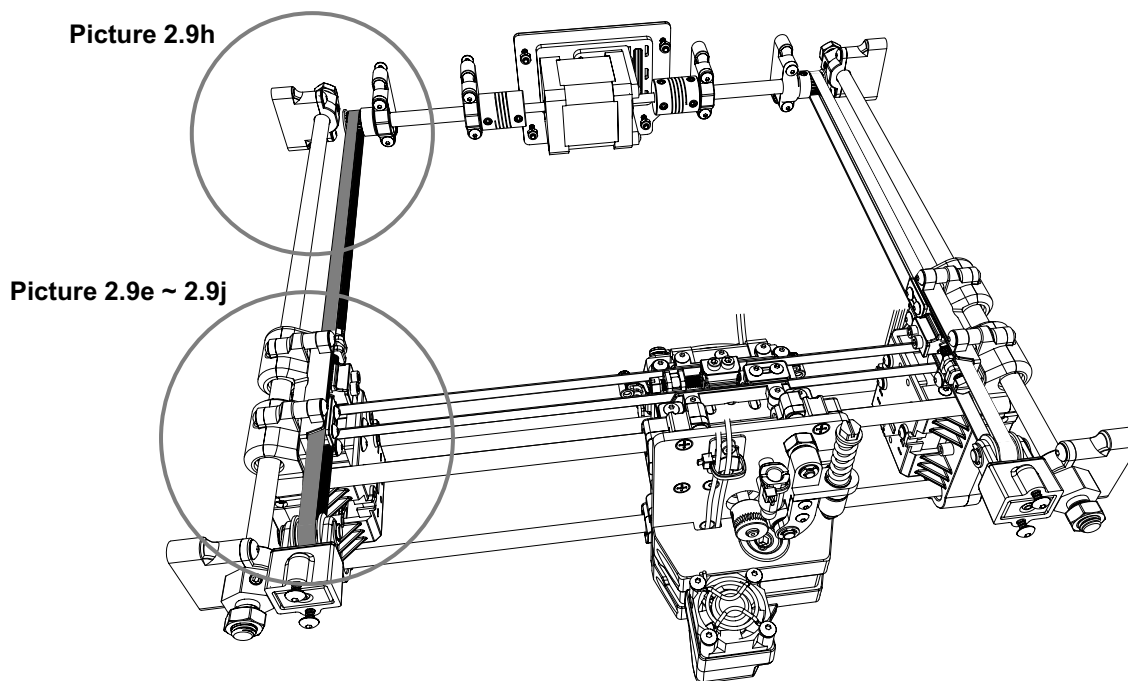
Picture 2.9d

Find the following accessories from: Box G



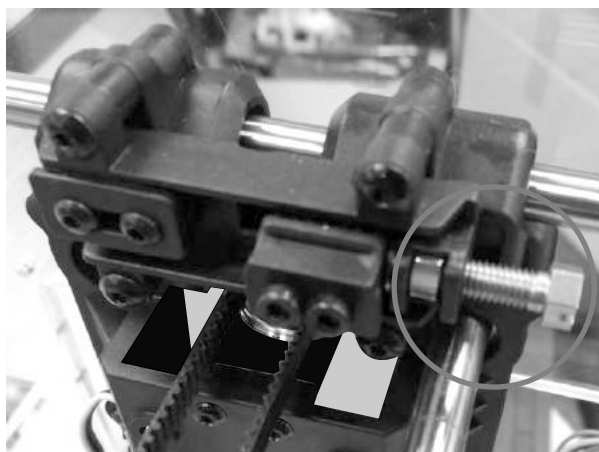
Timing belt (Short)
ETP0111

x2



Locate the two shorter belts (ETP0111). This step will be a lot like the belt installed on the X-axis. First turn the adjusting screw so the belt tension block is toward the back (**picture 2.9e**).

Now remove the front belt lock and install the belt like we did before (**picture 2.9f**).

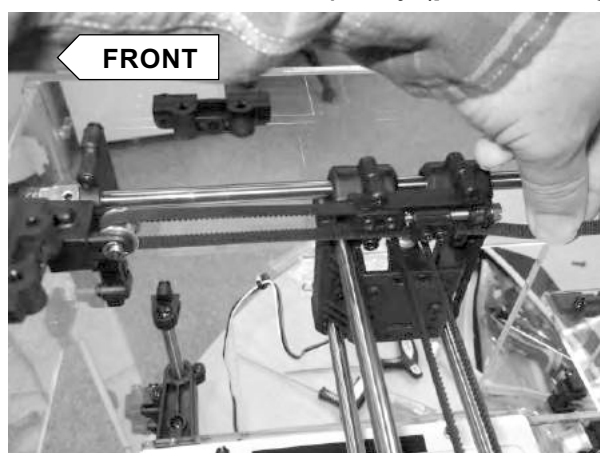


Picture 2.9e

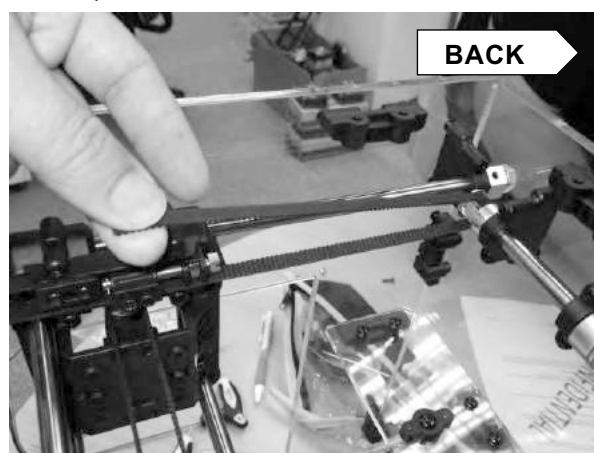


Picture 2.9f

Now wrap the belt through the front idler pulley and thread it through. Then guide it back around the rear motor pulley (**picture 2.9g** and **2.9h**).



Picture 2.9g



Picture 2.9h

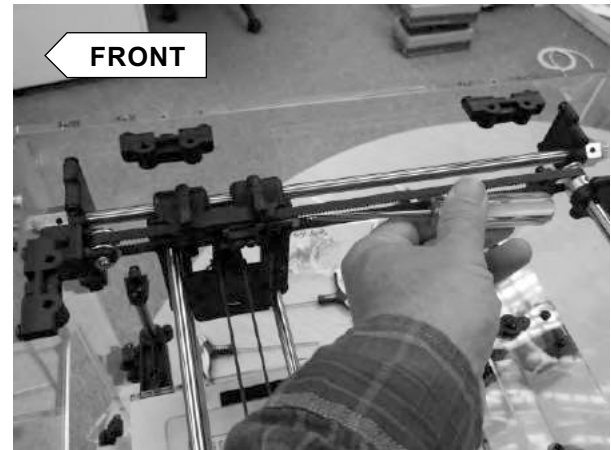
2.9

<3>

Remove the tensioning belt block and lightly pulling on the belt, mesh the teeth with the block and reinstall the block onto the tensioning screw (**picture 2.9i**). Now slide the gantry towards the front making it easier to get to adjusting screw (**picture 2.9j**). Adjust the tension on the belt as before till there is a light tension when twisting.



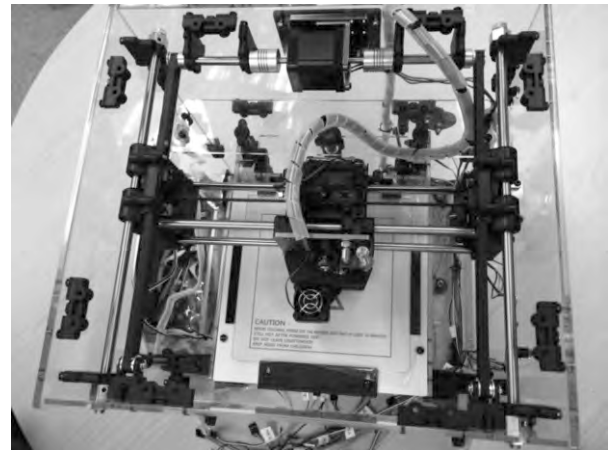
Picture 2.9i



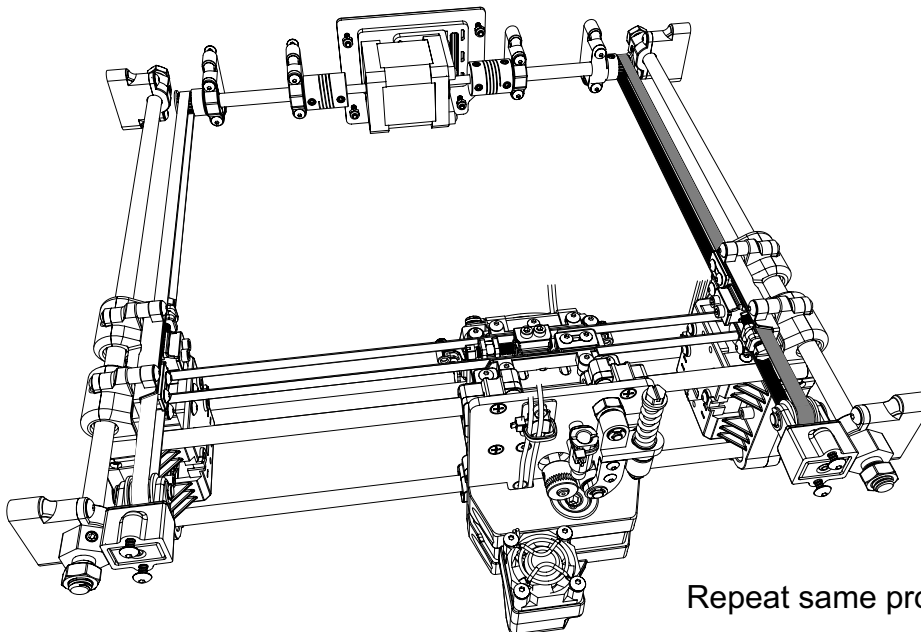
Picture 2.9j

Do not over tighten the belt, slide the gantry front to rear a few times and re-check the tension.

Fantastic now we are going to do the same thing on the other side. Slide the extrusion head to the left side and install the right belt following the same steps from the left side just flipped around (**picture 2.9k**).



Picture 2.9k

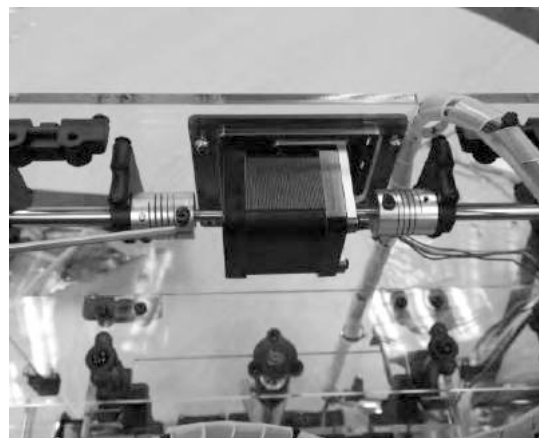
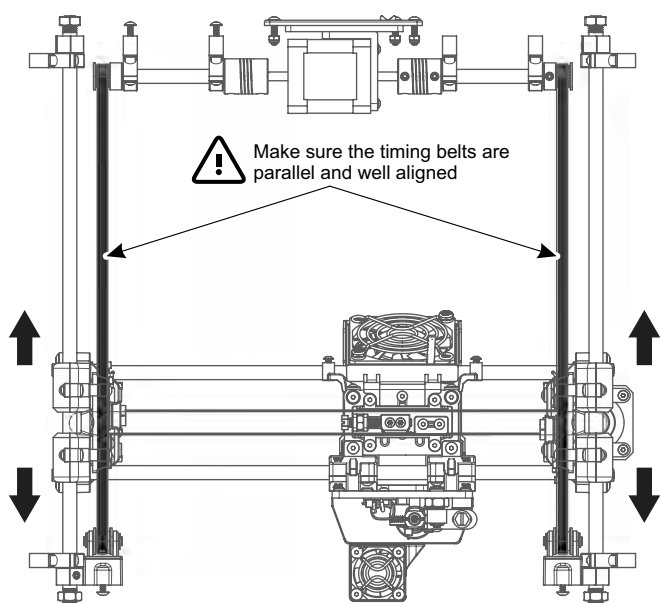


Repeat same process for right belt

2.9

<3>

Now that both belts are installed slide the gantry front to rear a few times and adjust two belts to match the looser of the two belt tension. Once done slide the gantry to approximately the center, having the two set screws on the flex collars we loosened before facing up so we can get to them easier.

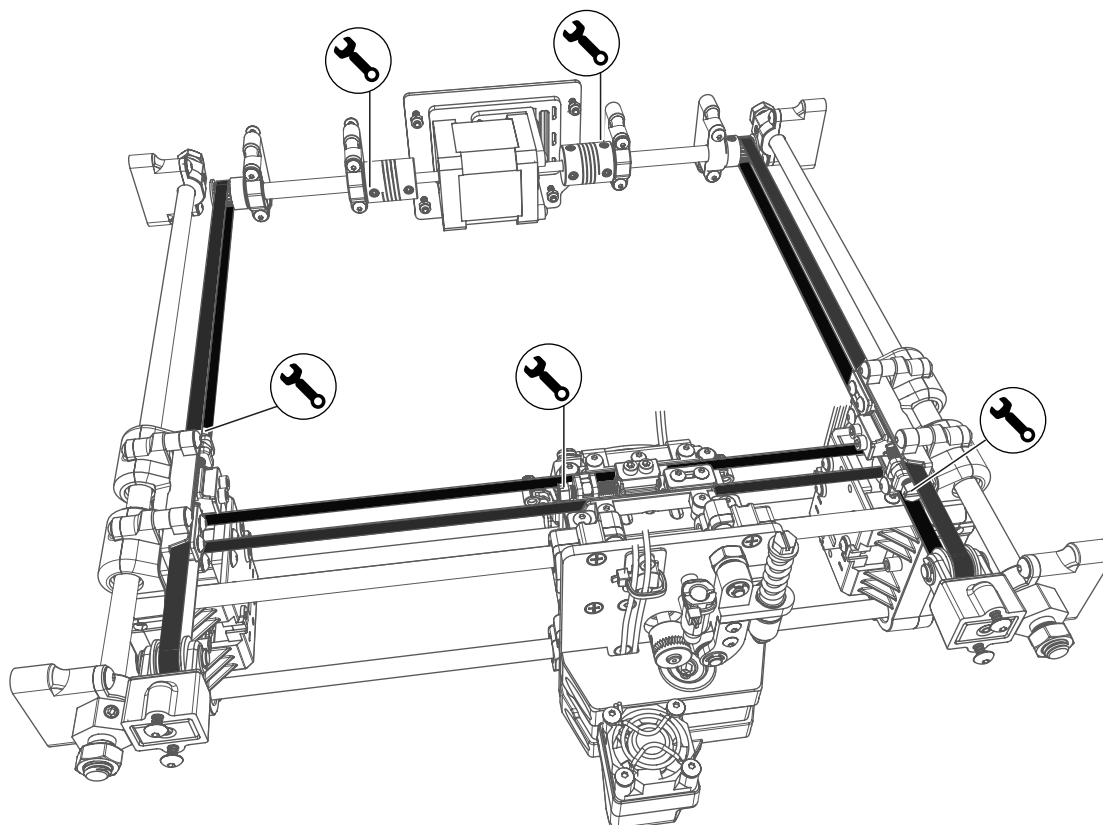


Picture 2.9I

Now tighten the two set screws on the flex collars and test the motion front to rear there will be a lot of drag but what we are checking for is that there is no binding in the motion (picture 2.9I).



Recommended to fine tune the timing belts at below points



2.10

<1>

We are ready to install the top panel, there is a small hole on one of the sides near the center cut out. This hole goes to the right side (see **picture 2.10a** for reference).

Find the following accessories from:

Box G

SCW0143
(TB4x14)

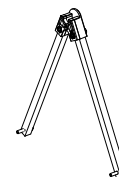
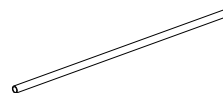
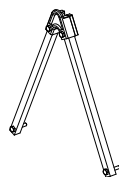
x16



Zip tie

Find the following accessories from:

Box D



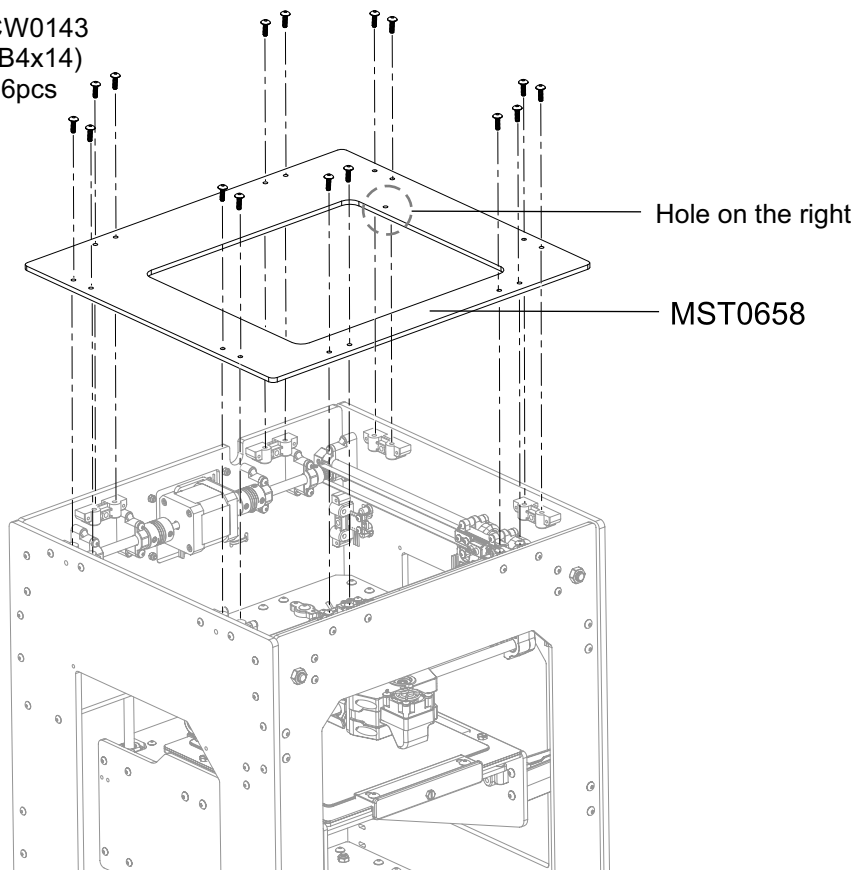
Filament spool holder
DSA3302-U17

x1



2.5mm hex
driver

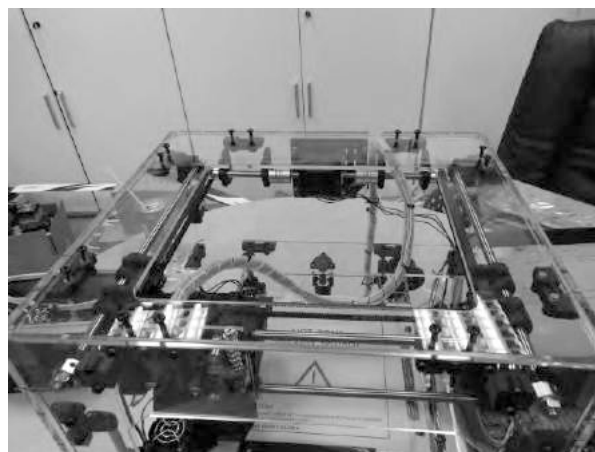
SCW0143
(TB4x14)
16pcs



Fit the top panel in place and make sure it seats flat and the small hole is to the right. Now install 16pcs of SCW0143 screws to hold the top panel down (**picture 2.10b**).



Picture 2.10a



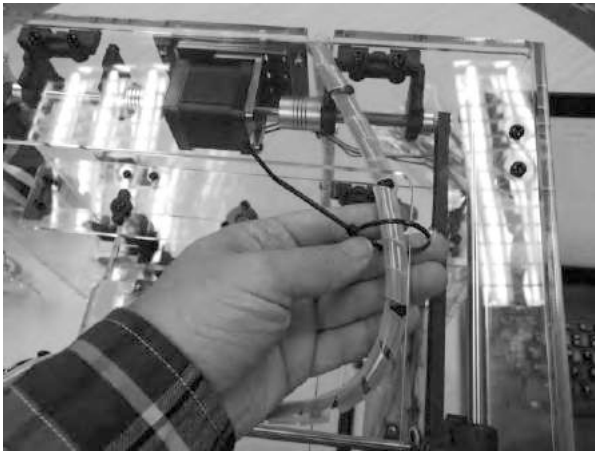
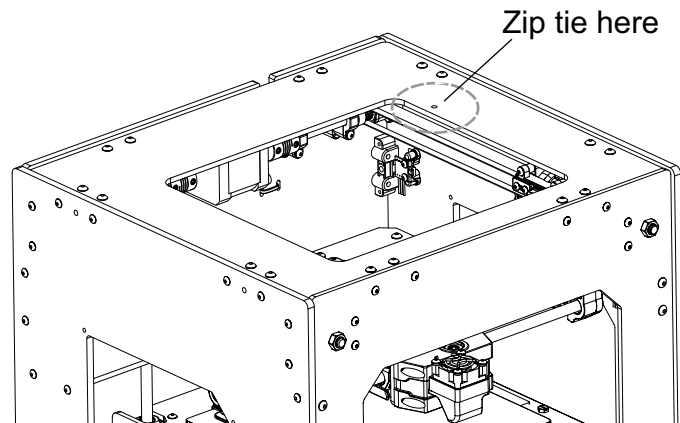
Picture 2.10b

2.10

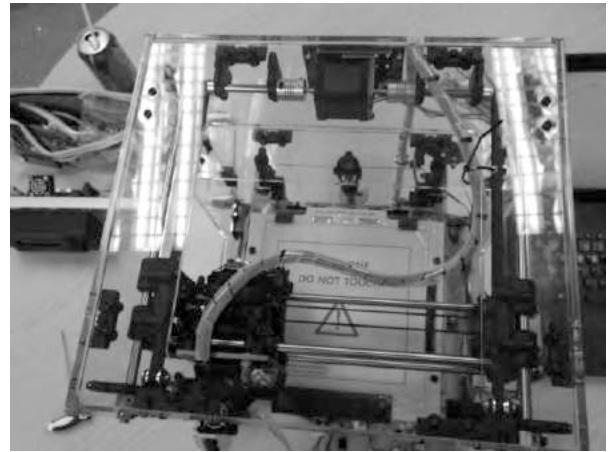
<2>

The next step is to secure the extruder wiring harness to the top panel using a zip tie.

Move the extruder to the **front left position** and then slip a zip tie in the right hole and secure up the wiring harness (**pictures 2.10c** and **2.10d**). This creates enough slack in the wiring harness to move around as well as keeping clear of moving parts.



Picture 2.10c



Picture 2.10d

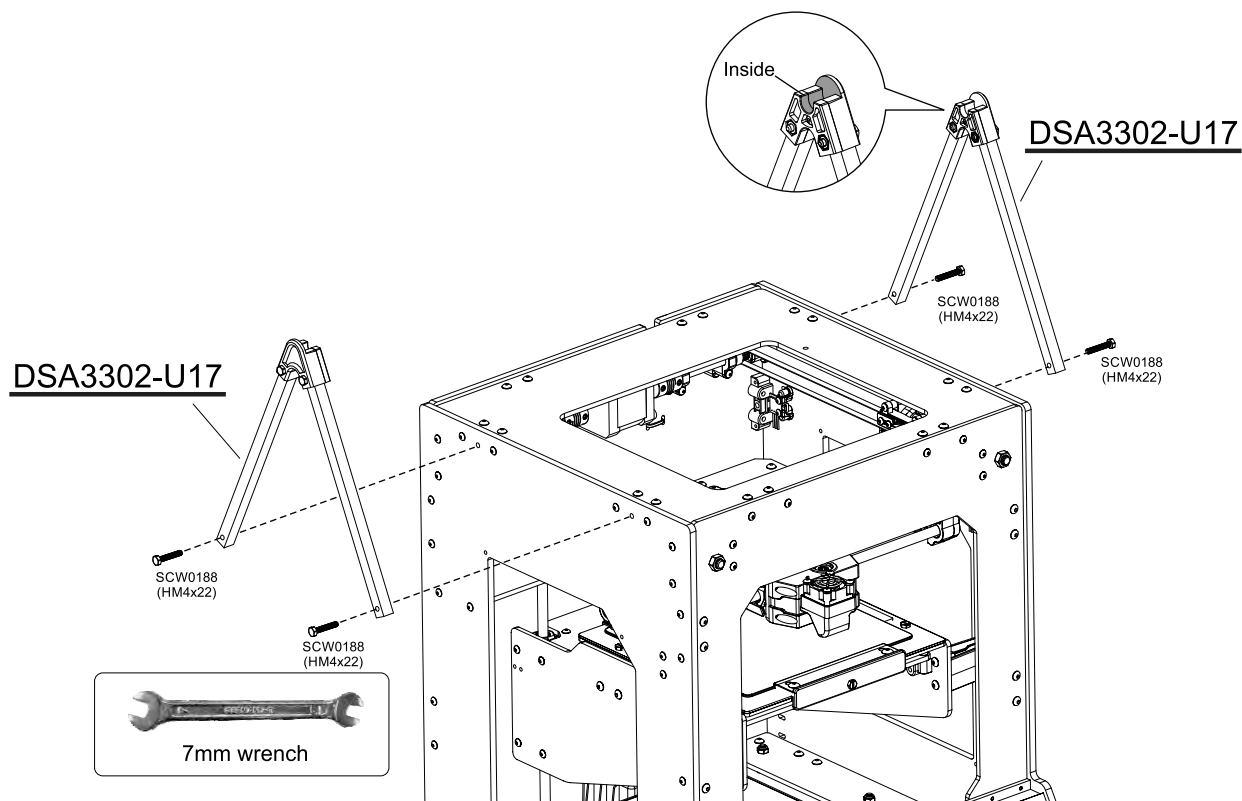
We will now install the filament spool support. The two upright supports are bolted to the side panels with 4 SCW0188 screws (**picture 2.10e**). The two supports have an inside and an outside if you look at where the two tubes come together and the plastic block there is a slot for the axle to the seat, there is a flat side that stops the axle from moving side to side. This flat side goes toward the outside (**picture 2.10f**). Tighten the two bolts using a 7mm wrench (**pictures 2.10g** and **2.10h**).



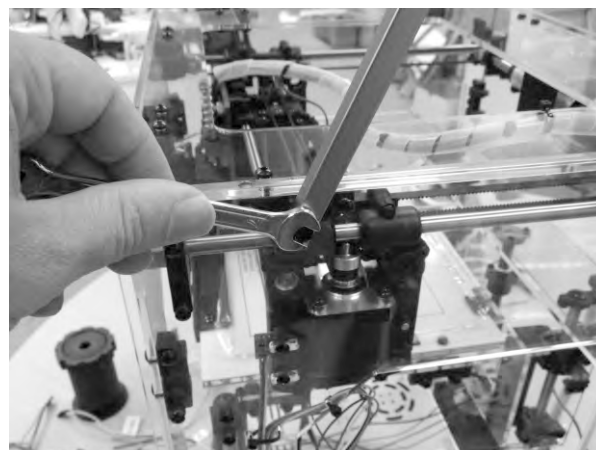
Picture 2.10e



Picture 2.10f

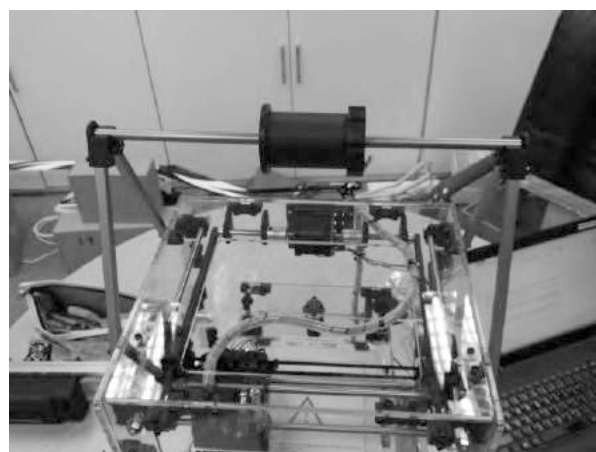
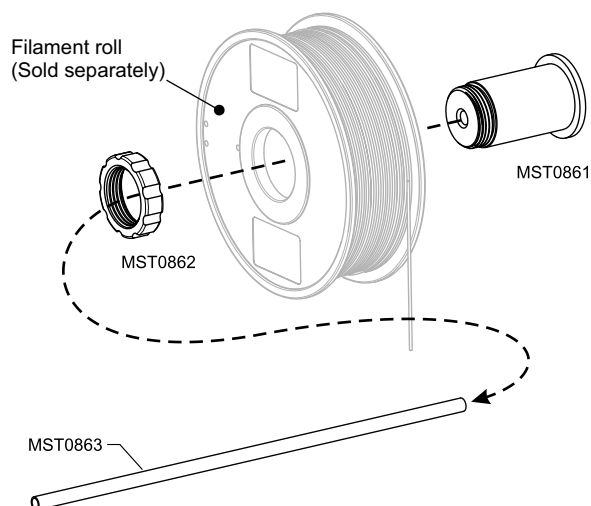


Picture 2.10g



Picture 2.10h

The Spool drum slips on to the axle and sets into the two upright supports we just installed (picture 2.10i).

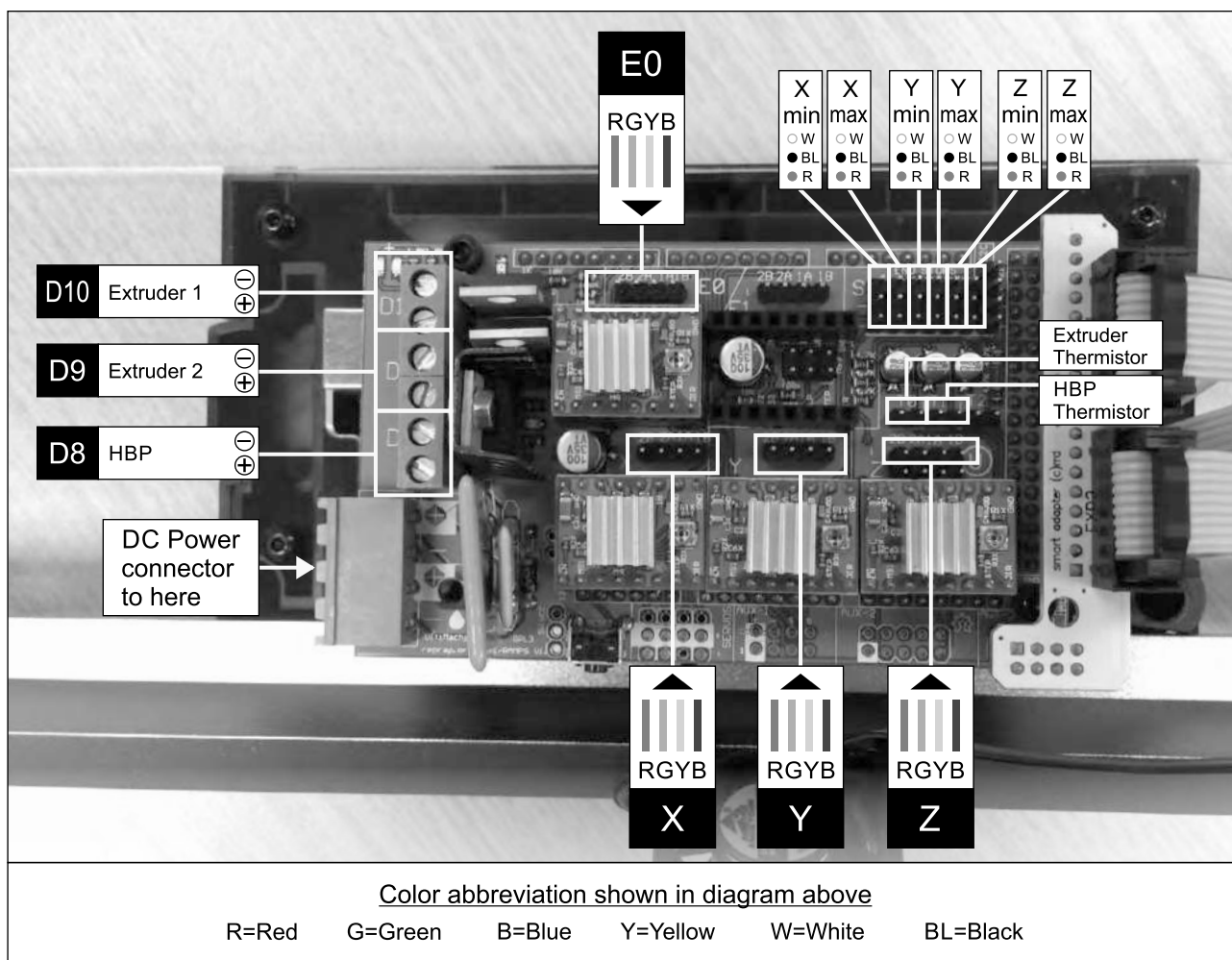


Picture 2.10i

2.11

<1>

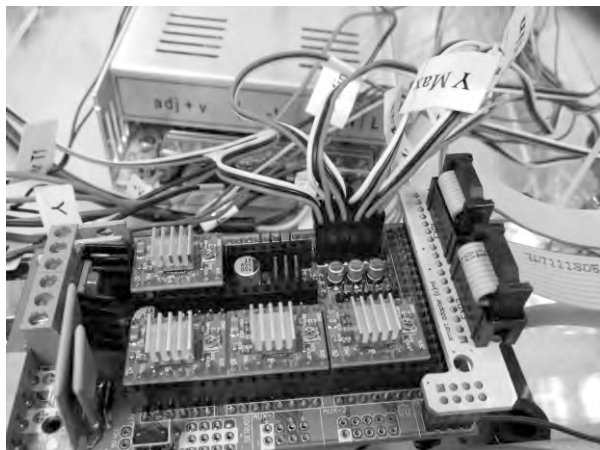
We are almost done with assembly! It's time we wire up the control panel. Referring to the diagrams we need to plug in the related cables, making sure to match the labels to position and color to direction. This may look like a lot, but it's really simple and we will do it in groups one by one for a simple pain-free assembly (**picture 2.11a**).



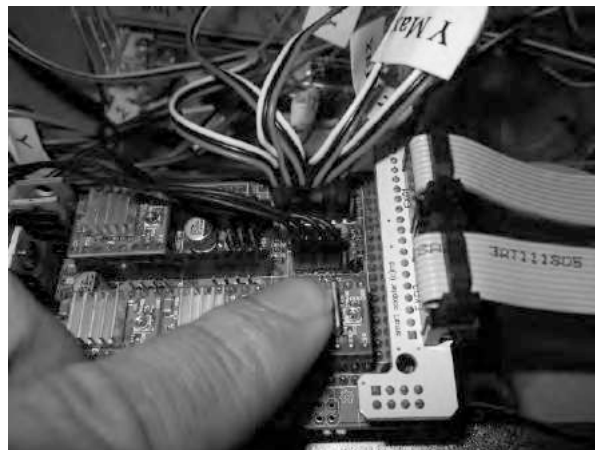
Picture 2.11a

Start with the position sensor wires, pay attention to the color vs pin position. There is a total of 6 position sensors, 2 for each axis (**picture 2.11b**). It may help to cut the two side zip ties to give more slack in the cables and once done re-tidy the cables and install new zip ties.

Next is the two temperature sensors, one for the heating bed (HBP Thermistor) and one for the extrusion head (Extruder Thermistor), these wires are black and only position is important not direction (**picture 2.11c**).



Picture 2.11b

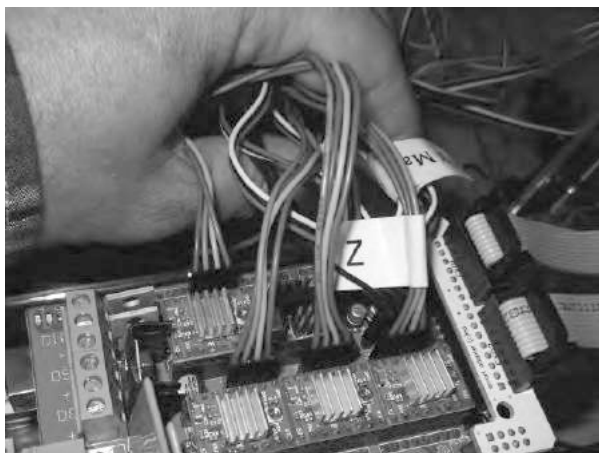


Picture 2.11c

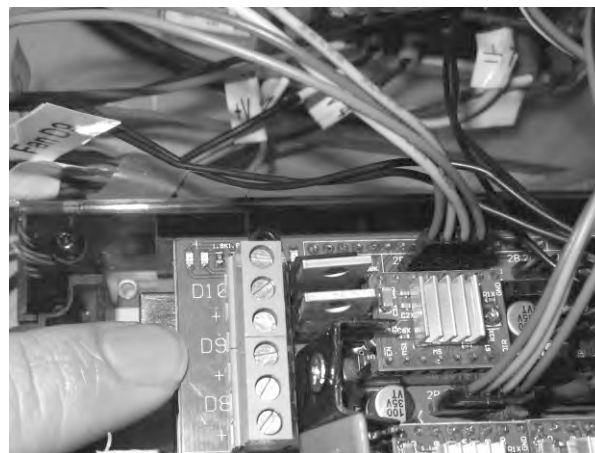
2.11

<1>

Now it's time for the stepper motors, these are labeled X, Y, Z, E0 for the given axis and extruder. Note the color wire position when plugging in the 4 motors (**picture 2.11d**).

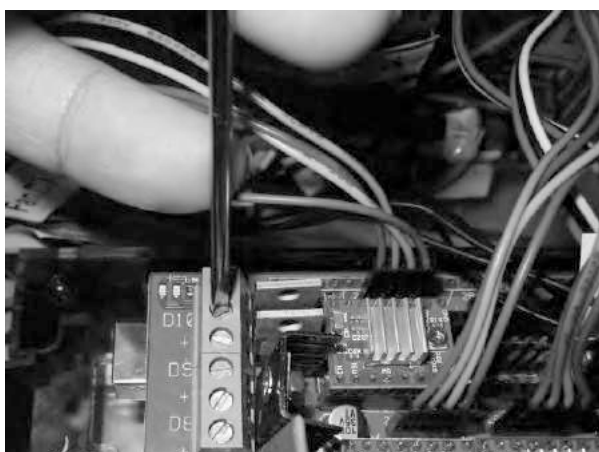


Picture 2.11d

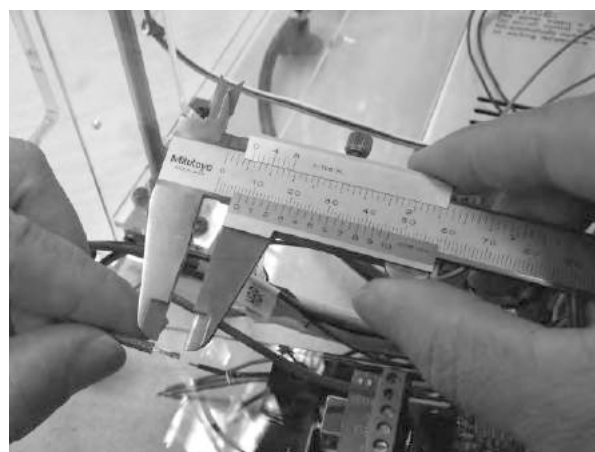


Picture 2.11e

We are going to move to the terminal blocks start by turning the screws on blocks (**picture 2.11e**) D10, D9, D8 counterclockwise to open up the wire terminal. This allows us to insert a wire and then by turning the screw clockwise it closes the terminal securing the wire (**picture 2.11f**).



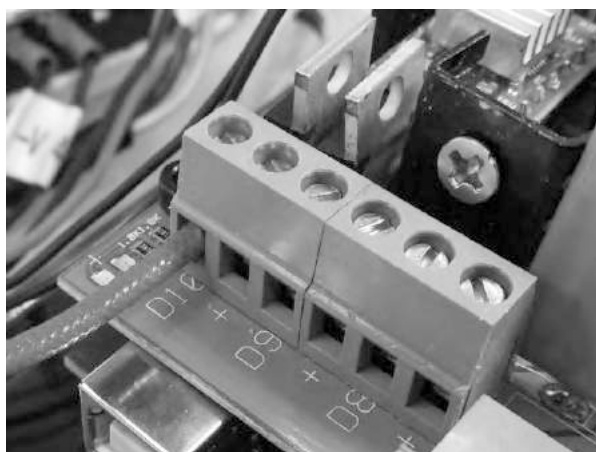
Picture 2.11f



Picture 2.11g

We are starting at block D10, which is the extruder heater. The two thick red wires need to have the insulation carefully removed / stripped exposing the wires, remove approximately 7mm of insulation (**picture 2.11g**).

Now install one wire at a time. Insert the first wire into the first D10 slot and turn the screw we just loosened clockwise till you feel the wire start to compress. Now turn the screw $\frac{1}{2}$ a turn more. Do not over tighten the terminal blocks. Give the wire a tug and make sure it feel secure and no stray wires are exposed (**picture 2.11h**).



Picture 2.11h

2.11

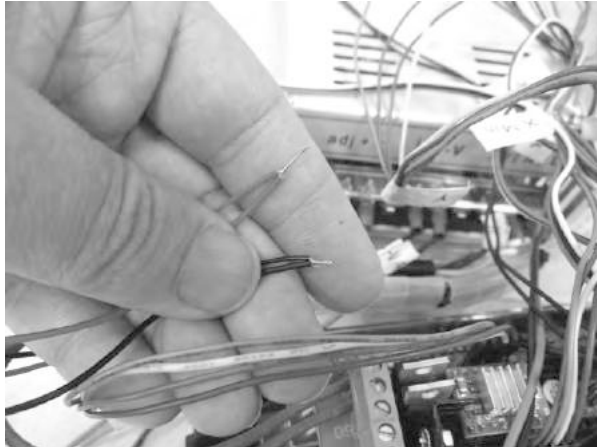
<1>

Now to block D9, this is the cooling fan output that is controlled by the G code to aid some types of plastics in the printing process. We need to strip the wires back 7mm just like before and install them the same way.

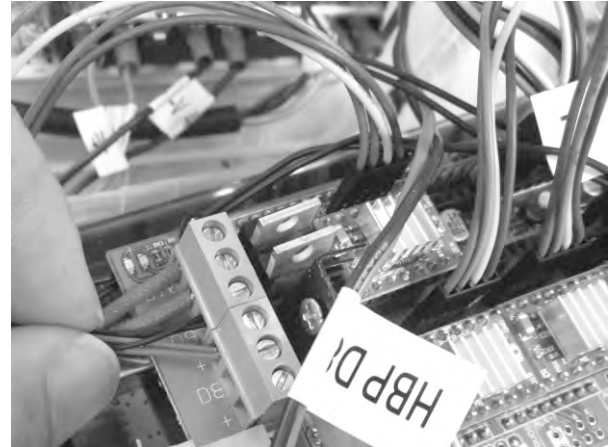
But there are two sets of wires, one for the front and one rear fan on the extruder and we need to pay attention to the color: "Red is positive and Black is negative". Strip back 7mm of exposed wire and twist the pairs together, red to red, and black to black (**picture 2.11i**).

Install the black wire set in it's denoted spot first. These wires are a bit smaller so once you start to feel the wires compress tighten one full turn.

Do the same for the red wire set next and lightly pull on the wires to make sure they are secured (**picture 2.11j**).



Picture 2.11i



Picture 2.11j

Block D8 is the heating bed output (to heat the built platform). Strip back the wires 7mm and install them the same way as before, noting the color / polarity to position. Tighten one full turn past first contact and lightly pull the wires to make sure they are secured (**picture 2.11k**).

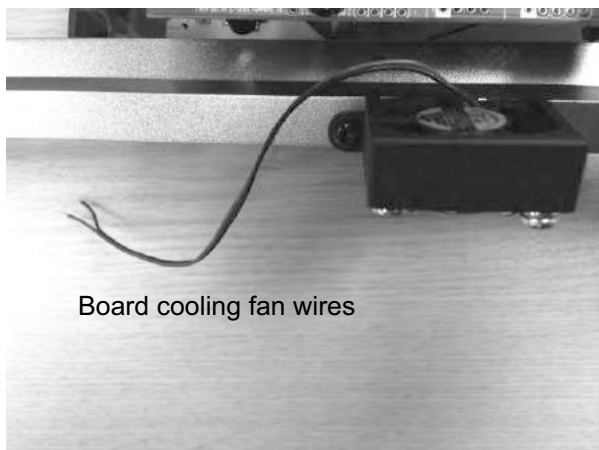


Picture 2.11k

2.11

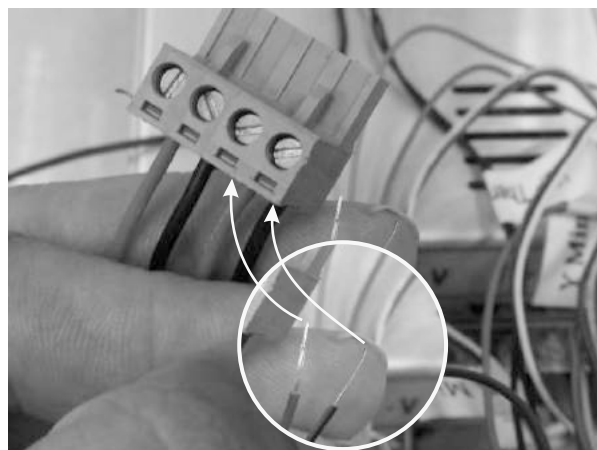
<2>

Great all that is left is to plug the DC power plug into the board and install the board cooling fan wires (**picture 2.11l**). Strip back the fan wires 7mm, be careful as these wires are small (**picture 2.11m**).



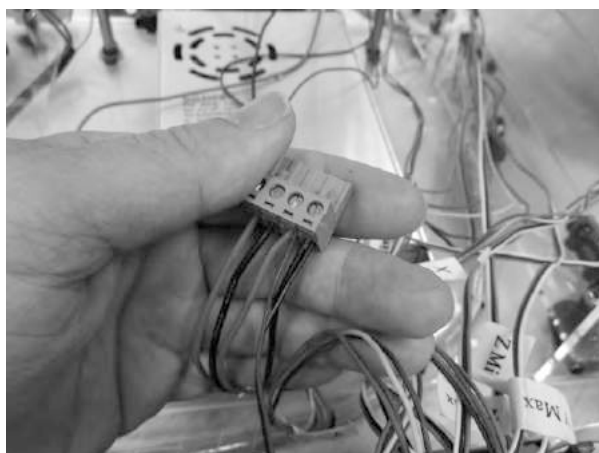
Board cooling fan wires

Picture 2.11l



Picture 2.11m

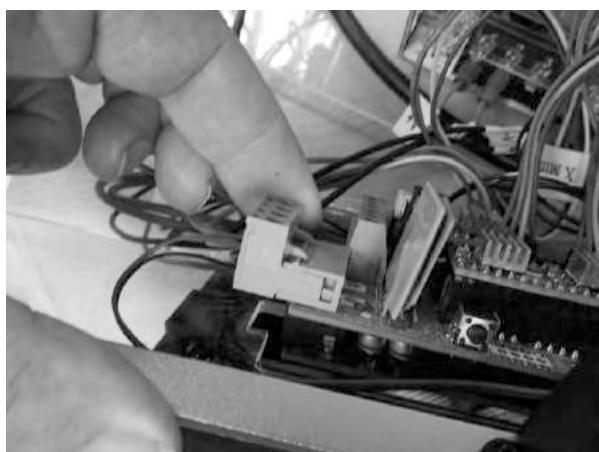
Loosen the top red and black terminal wires and slip the front board fan wires in matching red and black. Then re-tighten the terminals (**picture 2.11n**). Now plug the power connector to the main board (**picture 2.11o**) and make sure it seats flush (**picture 2.11p**).



Picture 2.11n



Picture 2.11o

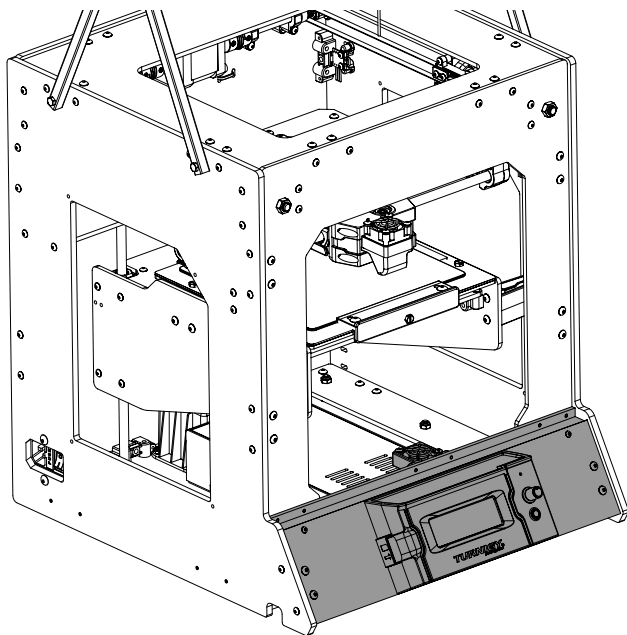


Picture 2.11p

2.11

<3>

Now we need to attach the front control panel to the printer and tidy up the wiring.



Find the following accessories from:

Box G



SCW0143
(TB4x14)

x4



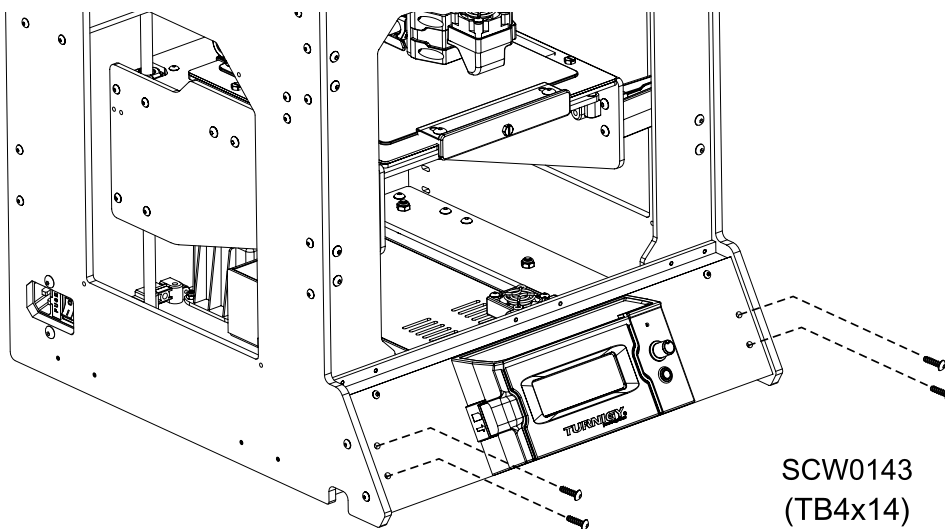
SCW0039
(TM3x8)

x4



Zip tie

Install the 4pcs SCW0143 screws in the front panel, leaving them slightly loose (**picture 2.11q**).



2.5mm hex
driver

SCW0143
(TB4x14)

x4

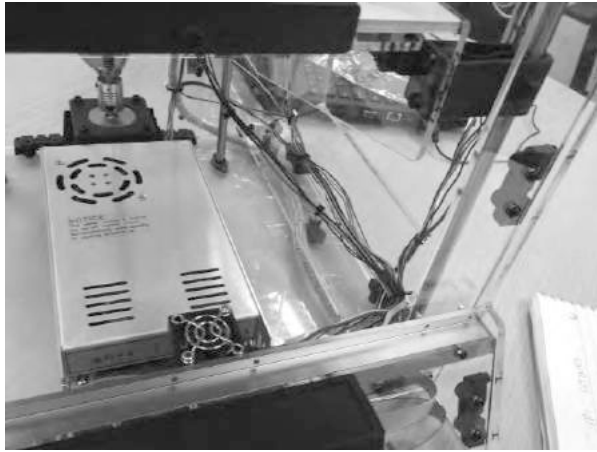


Picture 2.11q

2.11

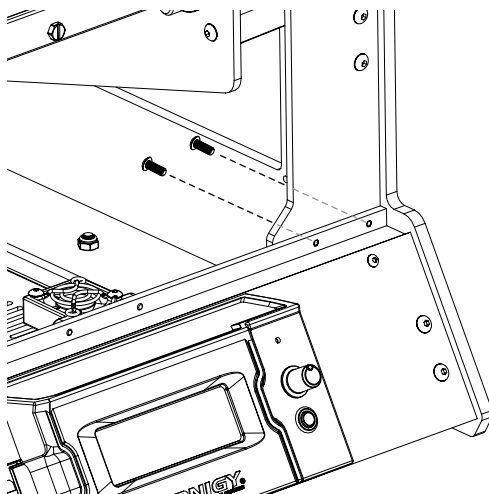
<3>

Now we need to zip tie the loose wiring and tidy it up (**picture 2.11r**).



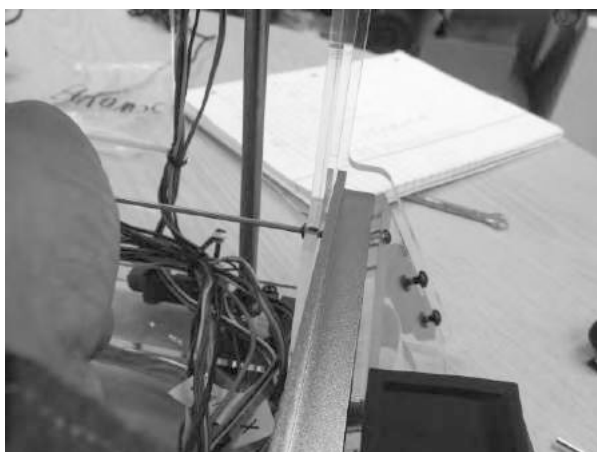
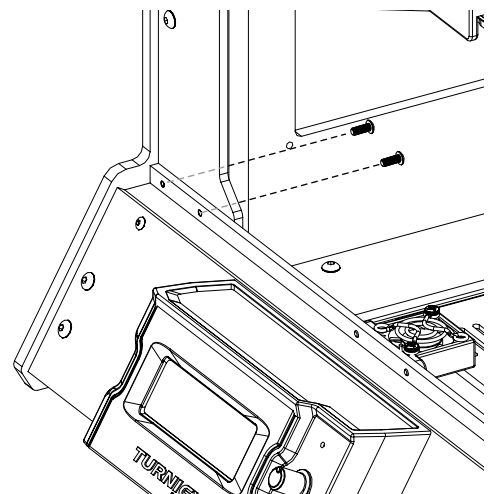
Picture 2.11r

Now install 4pcs SCW0039 screws from the inside (**picture 2.11s** and **below diagrams**), 2pcs on the left, 2pcs on the right. Once done, tighten the 4 outer screws we previously installed .



SCW0039
(TM3x8)

x4

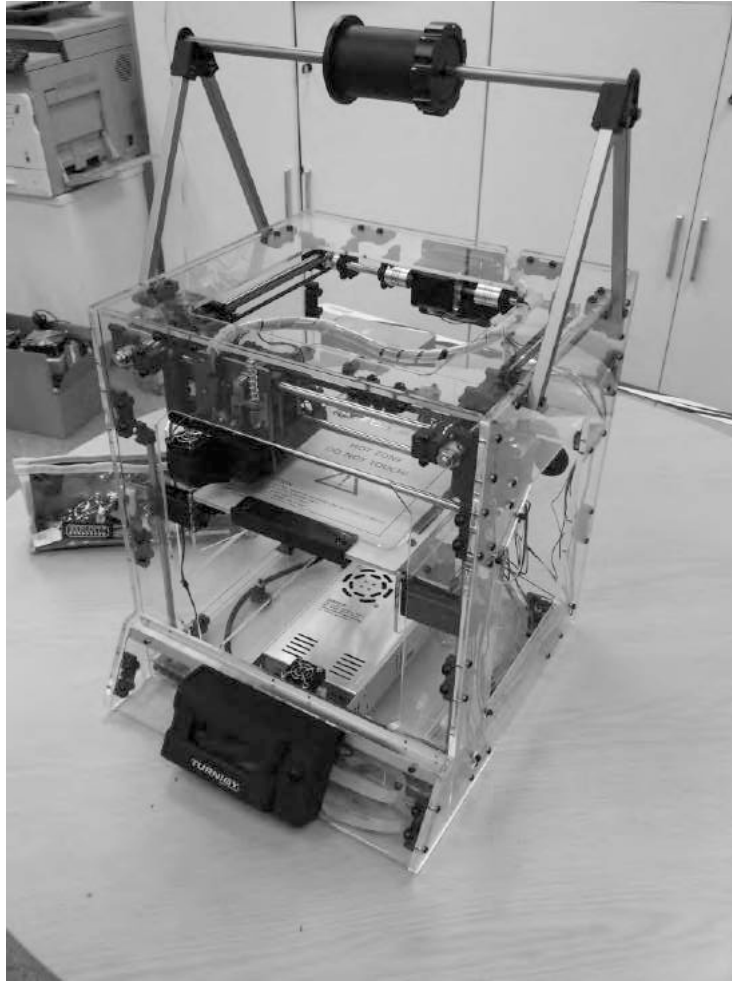


Picture 2.11s

2.11

<3>

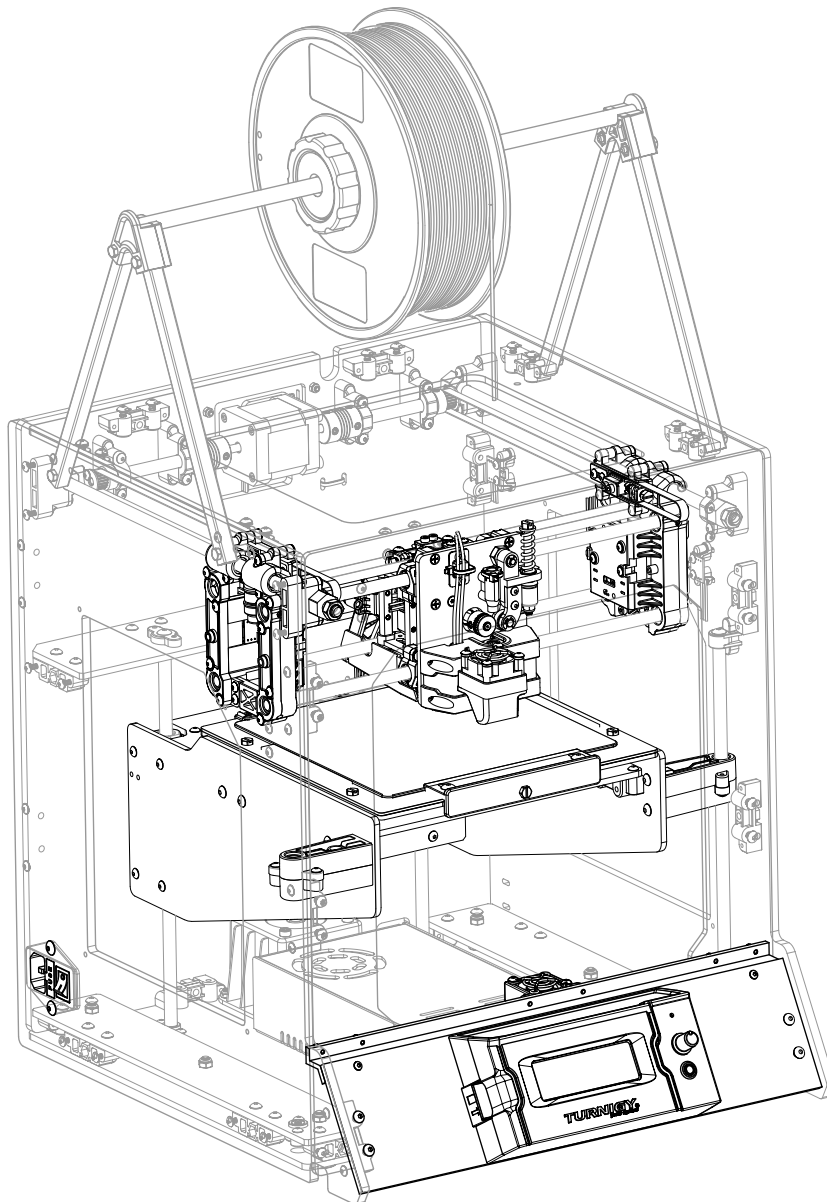
Congratulations, your 3D printer is now assembled. We still need to level the print bed and check the functionality. This will be covered in the setup guide.



3

Operational checks and preprint setup

This section will guide you through the process of operations checks and preprint setup

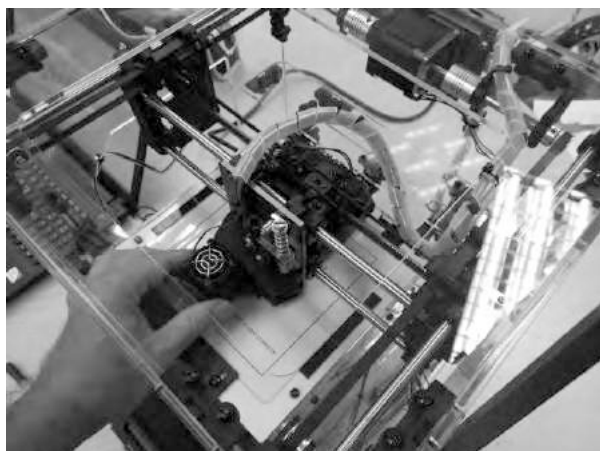


3.1

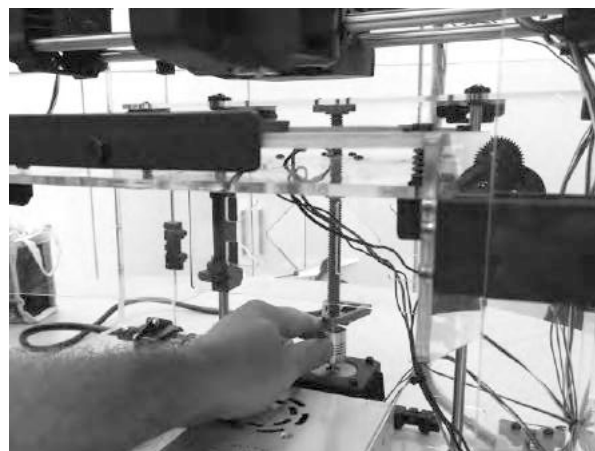
<1>

Now that the printer is built we need to perform an operational check of the sensors and motors and other components, then a Preprint setup.

First manually move the extrusion head to the approximate center of the print platform (**picture 3.1a**). Then turn the Z axis lead screw by hand to lower the print platform to about 1 inch (or about 25mm) below the extrusion head (**picture 3.1b**).



Picture 3.1a



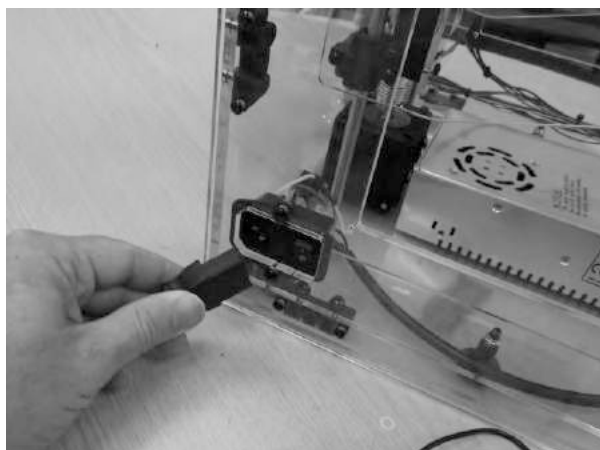
Picture 3.1b

Now look over all the wiring, making sure nothing has been pinched or damaged during assembly. Attach the A/C power cable to the left side port with the power switch in the off position (**picture 3.1c**). Make sure the power plug matches to the type of receptacle appropriate to your region, as well as double check that the main A/C power voltage was set properly in the assembly process for 110 or 220 A/C input (Consult with a professional if in doubt).



Turn off and lock-out system power before servicing.
Risk of electric shock or burn if failed to comply.

Plug in the power cable and turn on the main switch, the LCD will light up and after a few seconds and provide a main screen readout. This main screen shows the temperature of the heating bed, extruder and position of the gantry (**picture 3.1d**).



Picture 3.1c

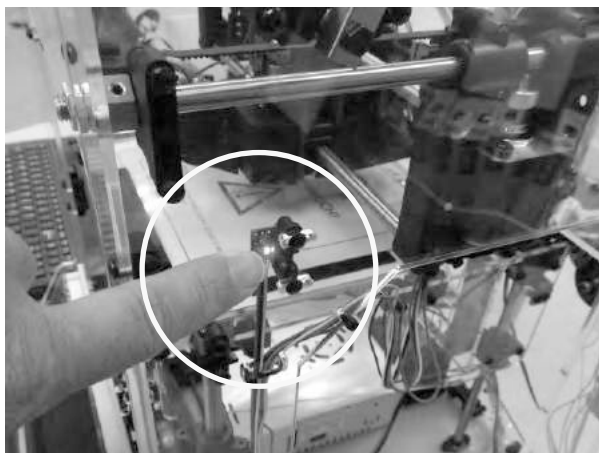


Picture 3.1d

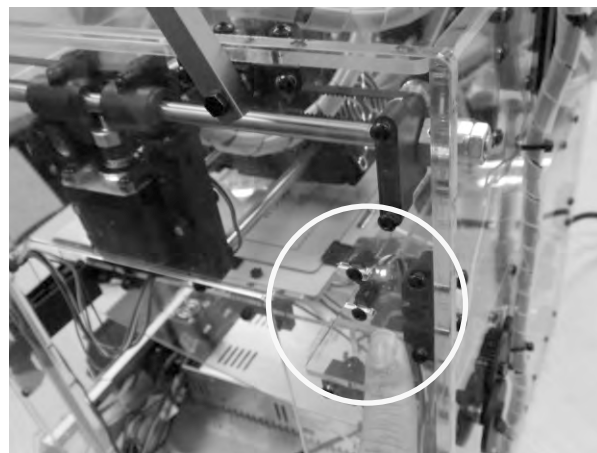
3.1

<1>

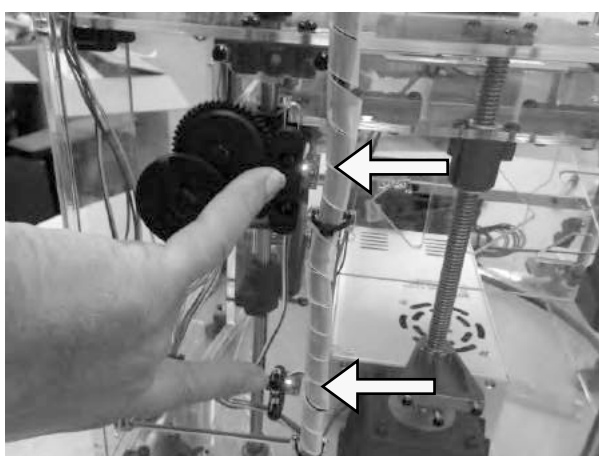
The first check is to look at the position sensors (total 6 sensors) to make sure they have a red LED light on (**pictures 3.1e ~ 3.1i**).



Picture 3.1e
(Right panel)



Picture 3.1f
(Right panel)



Picture 3.1g
(Back panel)



Picture 3.1h
(Gantry's right block)



Picture 3.1i
(Gantry's left block)

When the sensor is triggered the LED light goes out (this is why we moved the extruder to the middle). If you don't have a red light on one of the sensors turn the power off and make sure the print head or print platform is away from that sensor as well as check that the 6 sensors wires were plugged in following the color direction per the diagram in the control panel's assembly section.

3.2

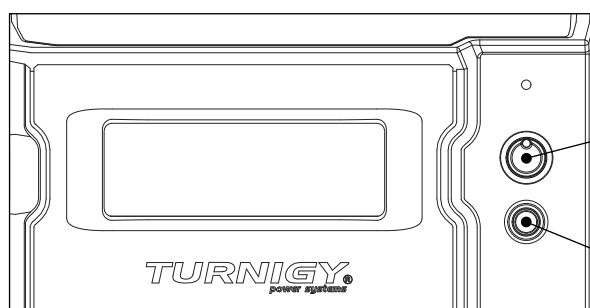
<1>

Next we need to check the motors for proper direction. Using the auto home feature, but first on the back of the printer we need to set the Z axis top sensor to the lowest setting. Do this by turning the knob counterclockwise till it stops (**picture 3.2a**).



Picture 3.2a

Auto Home position check



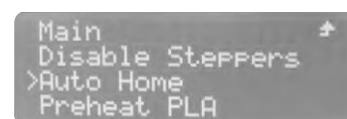
- 1) Rotary (for + / - or navigate)
- 2) Press (enter / to confirm selection)

Reset button

We are going to use the menu system to **auto home** the printer watching the direction the print head moves. Facing the front of the printer the left side is the one with the power cable.

Select Auto Home

To enter the menu, press the right knob in. To move within the menu rotate the knob. Main button --> Prepare --> Auto home.



Once we give the command to **auto home**, the print head will:

--> first move to the left --> then to the front --> followed by the print bed moving up.



Be prepared to quickly turn off the main power switch if it does not move left-->front-->up, or the motors continue to try and move the print head after it has moved to its extent. The motors if going the wrong direction or if a sensor is plugged in the wrong position will cause damage. If this happens refer to the troubleshooting guide.

3.2

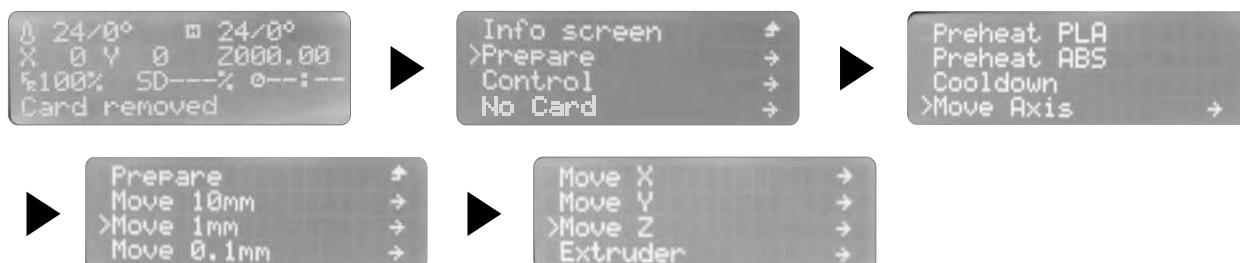
<2>

Now the 3D Printer is homed and knows its position relative to the print bed.

Next we need to level the print bed to the extrusion head. To do this we need to manually set the bed level and adjust the rear sensor followed by manual adjustment.

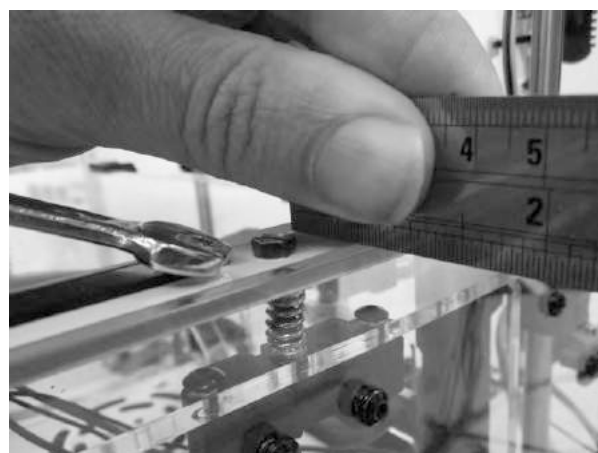
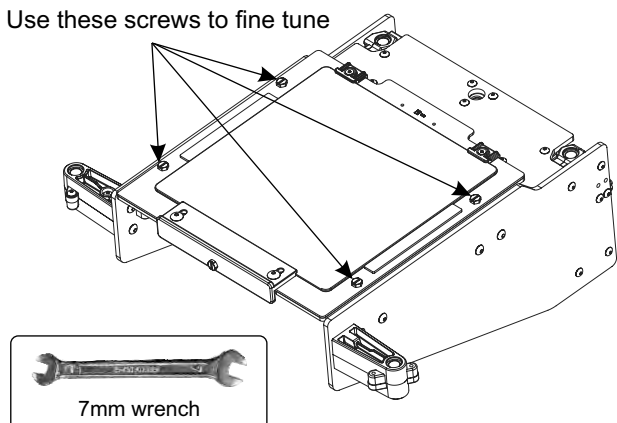
We need to enter the menu and lower the print bed so we can set its level. Press the knob to enter the menu and go to prepare scroll down to move axis scroll to 1mm, then scroll to Z. Slowly rotate the knob to the right lowering the print bed about 4 inches.

Menu --> Prepare --> Move axis --> 1mm --> Move Z --> rotate to move down

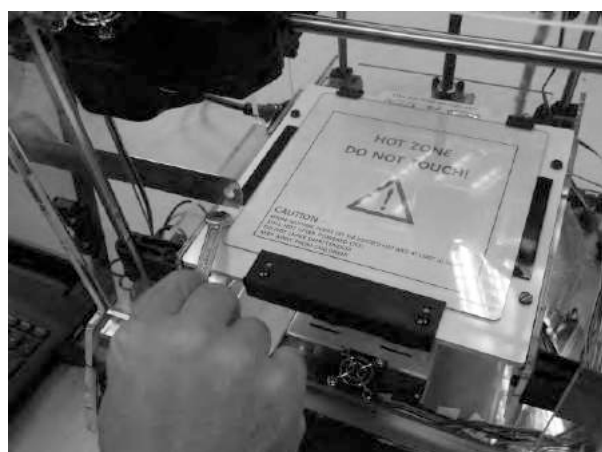


Once the bed has been lowered turn the printer power off. There are 4 bolts around the print bed that adjust its height. Using a straight edge such as a ruler, adjust the bed using a 7mm wrench to lower the printing plate level to the clear side arms (**picture 3.2b & 3.2c**).

Use these screws to fine tune



Picture 3.2b



Picture 3.2c



Picture 3.2d

Once a mechanical level has been achieved turn the printer on and perform an Auto home function from the menu, just like we did before. The print bed will move up close to the extrusion head, but we need to dial the setting in a little closer. We need to adjust the back sensor by turning the knob clockwise we will do this in increments equal to “an hour” on a clock. Imagine the back knob is a clock with 12 hours showing we will turn the knob that is equal to one hour, i.e. little adjustment (**picture 3.2d**).

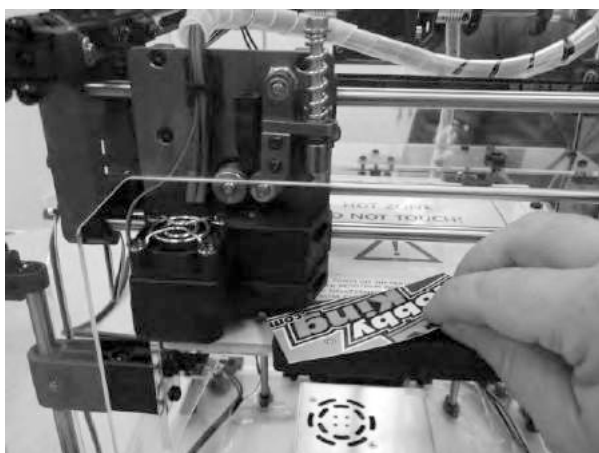
3.2

<3>

You will need two business cards (or cards of about the same thickness) for this procedure. We will use this to measure the distance from the print bed to the extruder nozzle and set the height.

Set the 2 business cards on top of each other on the glass print surface under the nozzle. The procedure is as follow:

- Turn the knob clockwise “one hour” and perform an auto home.
- Keep doing this moving the back knob by “one hour” increment each time till the nozzle touches the business cards and you can feel a light drag if you try and move the business cards (**pictures 3.2e and 3.2f**).



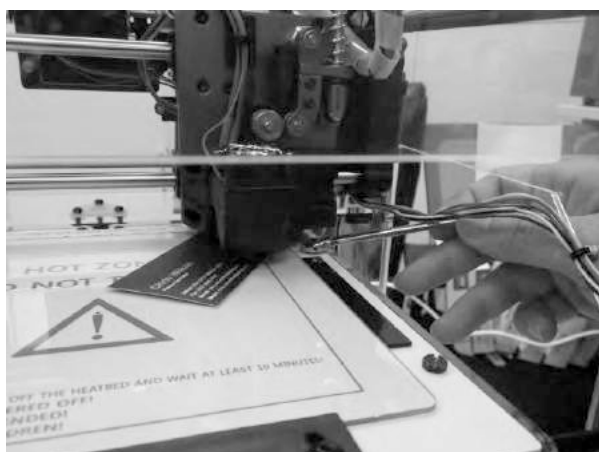
Picture 3.2e



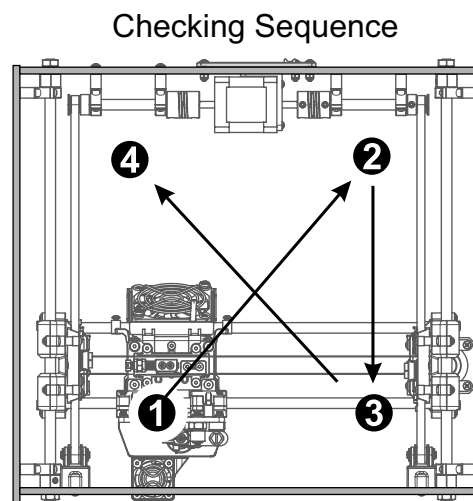
Picture 3.2f

Once you have the back sensor set to two business cards height, turn off the printer and remove the two business cards. We will now set the level and fine tune the setting.

With the power off slide one business card between nozzle and the bed, using a 7mm wrench, loosen the left front bolt that adjusts the bed till one business card just fits between the nozzle and the bed. Now manually move the extrusion head to the back right and do the same procedure. You may find you have to adjust the bed up or down. Slid the head forward to the right front and adjust the right front bed bolt till the card just fits, and now the back left position and bolt follow the same procedure. Once complete redo the sequence starting at the left front again, as adjusting one slightly throws the others off. Once this is set, it rarely needs to be adjusted again (**pictures 3.2g and 3.2h**).



Picture 3.2g



Picture 3.2h

3.2

<3>

Now we need to check the temperature sensors and heaters we are going to perform a preheat to make sure the sensors and heaters are working ok.

Turn on the 3D printer and look at the screen. The top line shows the extruder temperature on the left and the heating bed on the right. The first number is the current temperature both the bed and extruder should show within a few degrees of each other, and the number after the slash is the commented temperature that should show Zero (pictured below).

Extruder temperature

Commented temperature

Current temperature

Heating bed temperature

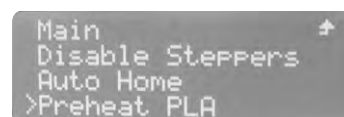
Current temperature

Commented temperature

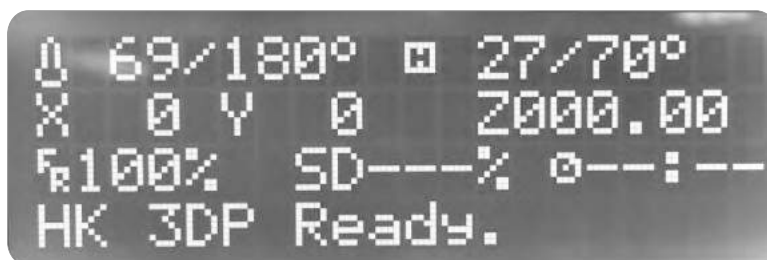


Perform an auto home function first, then enter the menu by pushing the knob as follow:

Menu --> Prepare --> Preheat PLA

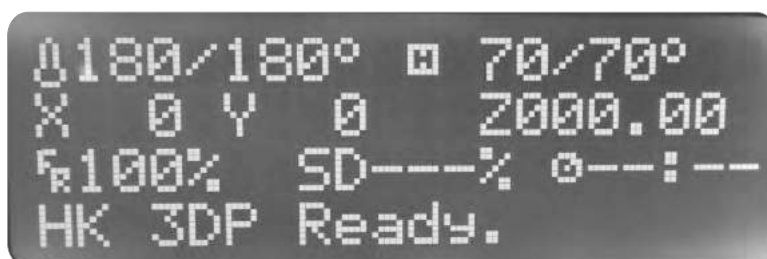


Once you select the preheat you will hear the fans come on and the temperatures on the main screen will indicate a requested temperature on the right side of each slash, showing 180° and 70° respectively (**picture 3.2i**). The numbers on the left of each slash will start climbing to match the requested amount.



Picture 3.2i

The extruder will heat very fast, the bed will take a few minutes to stabilize. What you want to see is the current temperature verses requested (you should see them rise to match the requested and stabilize, shown in **picture 3.2j**). Sometimes the temperature over shoots a few degrees and comes back down. What you don't want to see is the current temperature climb past the requested temperature and have a runaway. If it goes over by 7 degrees or more shut down the printer and refer to the troubleshooting guide.



Picture 3.2j

3.3

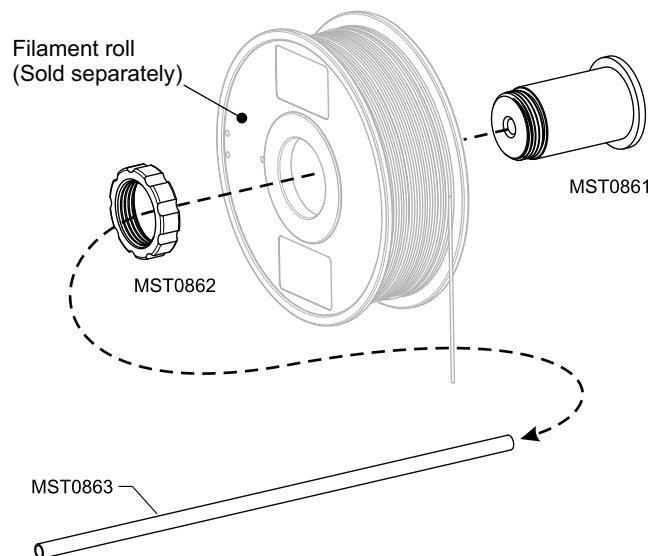
<1>

Now we need to load filament. PLA is recommended for new users. The 3D printer uses 1.75 filament and is a top load system.

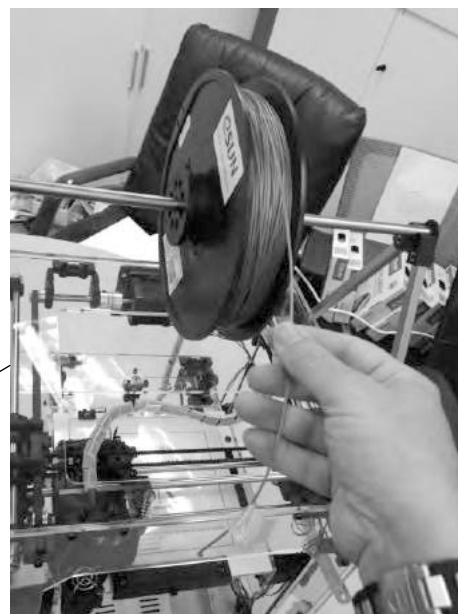
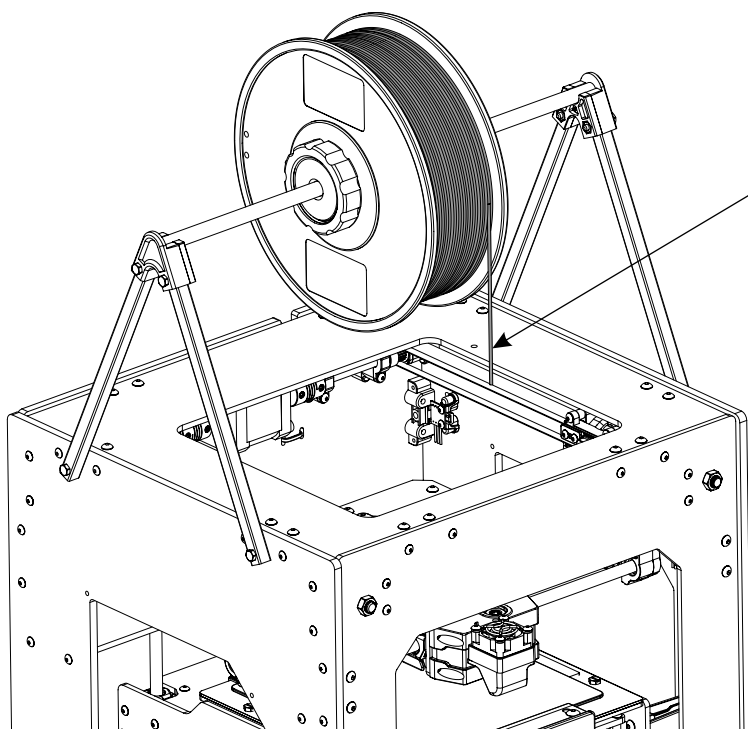
Lift off the spool axle and drum, unthread the drum end cap and slide your filament spool onto the drum and replace the axle (picture 3.3a). Install the Axle and spool so the filament unwinds to the front of the printer (picture 3.3b).



Picture 3.3a



Filament unwinds to the front of the printer



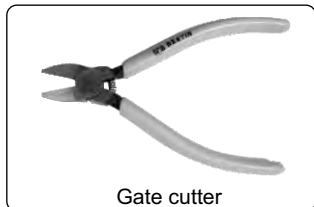
Picture 3.3b

3.3

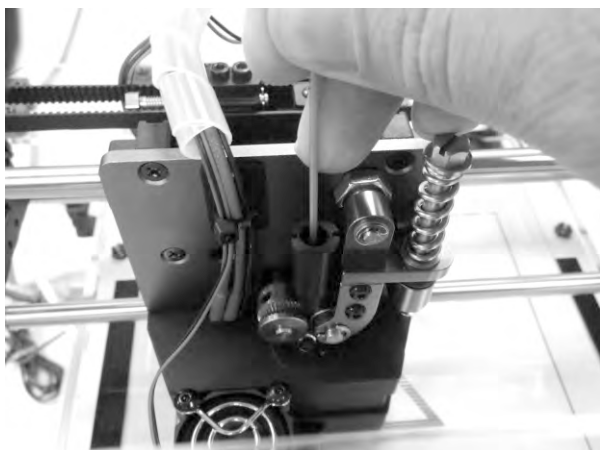
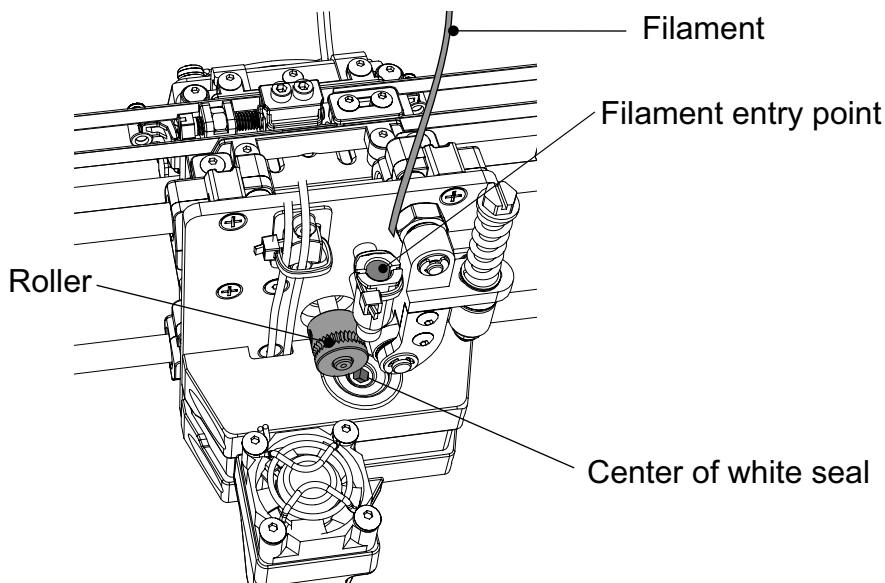
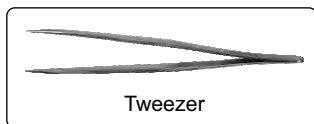
<2>

Perform a preheat as the extruder will need to be hot to load the filament. Now cut off about 3 inches of the filament, removing any bends or kinks and insert the filament into the extruder (**picture 3.3c**). You will need to push the filament past the roller, it will take a little pressure for it to compress the tension spring and this is normal. Once past the roller use tweezers to help guide the filament into the center of the white seal (**picture 3.3d**) and continue to push the filament down till you see some come out of the print head.

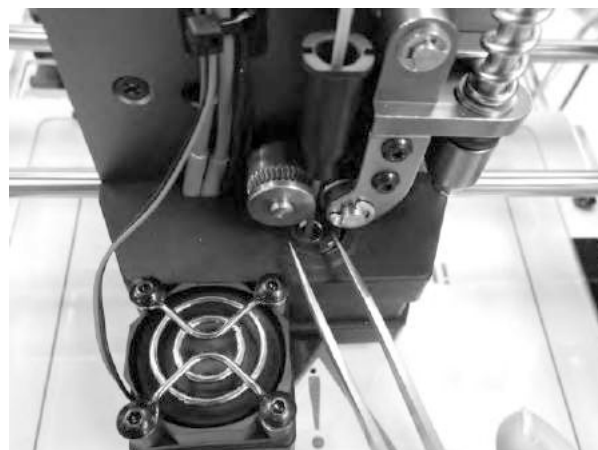
For cutting off filament



For guiding filament into extruder



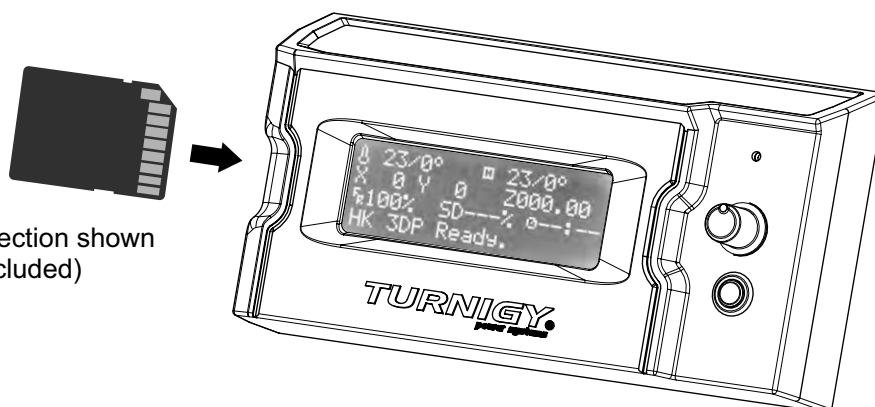
Picture 3.3c



Picture 3.3d

Congratulations! Your printer is ready to print. Please refer to the operations guide and videos to understand the operation of the printer and software.

Insert SD card per direction shown
(SD card not included)



The trouble shooting guide is a live dynamic and updatable document, that can be accessed online under the files tab of the 3D printer on www.HobbyKing.com

There is also an active forum on <http://www.rchouse.com/> dedicated to the HobbyKing 3D printer

Assemble,tips and tricks, trouble shooting video series is also available on YouTube under the HobbyKingLive channel.

